

•BIOGRAPHIC CLINICS

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THOMAS DE QUINCEY.

BIOGRAPHIC CLINICS

THE ORIGIN OF THE ILL-HEALTH •
OF
DE QUINCEY, CARLYLE, DARWIN, HUXLEY
AND BROWNING

BY

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Ordered by
Dr. Bissell Miller
671-A, Madison Ave. (opposite Lane)
NEW YORK

LONDON NOT EXCHANGEABLE AND
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129, Shaftesbury Avenue, W. C.
1903

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"The improver of natural knowledge absolutely refuses to acknowledge authority, as such. For him, skepticism is the highest of duties; blind faith the one unpardonable sin. And it cannot be otherwise, for every great advance in natural knowledge has involved the absolute rejection of authority, the cherishing of the keenest skepticism, the annihilation of the spirit of blind faith; and the most ardent votary of science holds his firmest convictions because his experience teaches him that whenever he chooses to bring these convictions into contact with their primary source, Nature—whenever he thinks fit to test them by appealing to experiment and to observation—Nature will confirm them. The man of science has learned to believe in justification, not by faith but by verification."—Huxley, *Advisableness of Improving Natural Knowledge*.

"He that can abolish pain, relieve his fellow mortal from sickness, he is indisputably usefulest of all men. Him savage and civilized will honor. As a Lord Chancellor under one's horsehair wig there might be misgivings, still more so, perhaps, as a Lord Primate under one's cauliflower, but if I could heal disease I should say to all men and angels without fear 'En! Ecce!'"—CARLYLE.

"If by gaining knowledge we destroy our health we labor for a thing that will be useless in our hands."—BACON. 3

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INTRODUCTION.

Medical science and art has heretofore busied itself with three aspects or phases of disease:

1. With the patient's complaint upon the day of consultation, or during the time of the special illness. Rightly but crudely the primary function of the physician is held to be to get the patient over his present trouble and let the future take care of the future illness. The average physician will hardly recognize the remote causes which brought about the present disease, its far-off results, and the multiform relations of this special condition with others, physiologic and pathologic, and with the habits, duties, and necessities of social life; even if these subtle causes and relations were sought and considered the patient would not recognize nor appreciate the service, and certainly would not pay for it. "Make me well again and quickly," is his sole demand, and hence this must be the physician's task.

2. When the physician has succeeded, or perhaps has failed, in this special duty, he thinks how he may treat other patients suffering from the same complaint, and he writes of his experience and of his success or fail-

ure, in such cases, always concerning the single disease in question and its cure. Again, the infinite variety of pathologic origin, and, as affecting different patients, the relationship of the special disease to the entire life of the patient, are not thought of.

3. The philosophic physician and the pathologist seek to learn the pathogeny of a single type or kind of disease, as of tuberculosis, syphilis, etc., apart from all individual origin and relations. The suffering, even the existence, of the individual patient is not in the attention.

Necessary and wise as are these aspects and duties, there is a fourth professional obligation quite as important as the three, scientifically even more so, which we have entirely ignored. To its consideration we must in the future devote our attention to an increasing degree, and in doing so we shall unexpectedly benefit the patient and the world. In this work, too, we shall gain professional power and honor and bring back to his splendid function the almost extinguished family physician, or general practitioner. I allude to the patient's life-problem, the duty of studying the life as a whole, all of his diseases, past, present, and to come, and what relation they bear to his life and sociologic conditions. This clinical life-problem pertaining to the diseases, disabilities, and entire career of life, will in time surely come to interest more and more, as "the problem of the future" becomes of

greater interest to each one, and to science as a whole. Such a consideration of a man's entire life and how disease conditions it, is primarily a historical study. It is true that such a study is impossible with many of our patients, because they sometimes live as long as we do, or longer; but even here this want is filled by a careful study of the family history and ancestors, of the past personal history, and of present conditions. Science is accurate knowledge and foreknowledge, and as our medical science improves in accuracy, we, like the paleontologist, are more and more able to reconstruct the picture of the entire organism and its essential history from a single relic, as, *e. g.*, a bone or a tooth. The patient before us is ~~his~~ history and a prophecy. But the method of thus historically envisaging and massing the life-work and life-difficulty, can best be suggested and illustrated by the medical description of past lives. This, so far as I know, has never been done, at least with scientific thoroughness and sociologic largeness of view. Mere hints of such a method, so far as I have any medical knowledge to warrant it, I have sought to give in these sketches of the medical facts of the lives of De Quincey, Carlyle, Darwin, Huxley, and Browning. Manifest imperfections are largely excusable on the ground of an almost utter lack of clinical data. We are able to do no more than catch glimpses, faint and fleeting, of the facts through the incidental, unintended, and medically

crude allusions of friends, or of the poor, patients as they groan and sigh under the load of their uncomprehended afflictions. Like flashes of lightning of the past storm these reveal for an instant the whole landscape of their time and work and suffering. Such swift visions can only be made scientific through a systematic and periodic study of the physiologic and medical tests of patients during their whole lives.¹ Clinics should be held on the entire life of the patient, and until this is scientifically possible by a system of biologic and clinical examinations, we must glean our pitiful aftermath from the biographies and letters, etc. The million case-records left by dead physicians, are either worthless or lost, as these possibly most precious clinical data are considered of no value.

The foregoing study of the clinical biographies of five of the greatest geniuses of England concerns but one class of symptoms and one disease-producing factor. Of other diseases and other patients I am not competent to speak. The field will be found untilled and productive by specialists in other departments in medicine. But to the historian and psychologist the role of eyestrain will be especially interesting because

¹ The outline of the objects and methods of such biologic and pathologic life-studies I have given in an address, entitled, "A System of Personal Biologic Examinations • the Condition of Adequate Medical and Scientific Conduct of Life," *Jour. Am. Med. Assoc.*, July 21, 1900.

of its subtle and astonishing influence upon character, upon literature, and even upon history. None could pretend to a fraction of the insight which could see the profound differences in our literature and civilization consequent upon the injection of the eye-strain factor. What could these men not have done, what would they not have done, if this morbidizing horror had not clutched their hearts with its palsying and despoiling hand? Certainly also every tenth person of the slaves of civilization, all those who are compelled to work with their eyes at the reading, writing, and handwork distance, are to-day having havoc played with their minds, dispositions, and workaday lives, by this unrecognized disease factor. I am told that an abnormally large percentage of criminals and the youth consigned to reformatories have high degrees of optical and other defects of the eyes. Out of 68 cases of epileptics examined, 98 percent had astigmatism, and 50 percent had the very rare and most injurious defect, unsymmetric astigmatism. There is no considerable part or kind of our social life, the drink-problem, the labor-problem, all handicrafts, family tragedies, etc., in which the subtle influence of morbid vision is not at its office of evil.

Whether physiologic or pathologic, the eye is necessarily actively functional during every instant of the waking life. It is bound up with every emotion and guides every concept. Our thinking is by photographic

images; even the letters of the alphabet are conventionalized pictures. When vision is morbid there is therefore no limit to the kind and extent of resultant harm both to the organism and to the life.

• DE QUINCEY.

CHAPTER I.

THOMAS DE QUINCEY.

THE principal clinical facts I have been able to gather from the biography and letters of De Quincey are epitomized in the following notes and quotations:

He was born August 15, 1785.

He was, at 14, "a boyish and energetic character."

At 14 years of age, he was probably the best Greek scholar in Europe, conversing in that language fluently. His Latin verses were paraded as models by his teachers before the older boys. His passion for books was so great that he went heavily in debt for them beyond his allowance.

He had to be removed from school at the age of 14 or 15, "in consequence of a very alarming illness threatening his head," which lasted more than a year. A slight blow on the head while at school was erroneously spoken of as the cause of his illness.

Good spirits returned but he continued to suffer much at intervals from pain in the head.

"As to health, I may say fairly that I have not passed one quarter of the time I have been at this school in health. I have not, it is true, been seriously ill, but I have been, what is to me worse,—weary and torpid and languid." He complains chiefly of want of exercise. (This was at the age of 16.)

At the age of 17 he could endure it no longer; he borrowed some money and ran away to Wales, where he carried a tent, wandered about, sleeping in the open air, sometimes living on "blackberries, hips, and haws," and random hospitality. His health improved, but his money failed and he came to London.

His life there is told in the first section of the "confessions."

"About 1802 a hideous sensation began to haunt me as soon as I fell into a slumber, which has since returned upon me at different periods of my life—viz., a sort of twitching (I knew not where, but apparently about the region of the stomach) which compelled me violently to throw out my feet for the sake of relieving it. This sensation coming on as soon as I began to sleep, and the effort to relieve it constantly awaking me, at length I slept only from exhaustion, and, through increasing weakness, I was constantly falling asleep and constantly awaking."

He consented to study at Oxford, but in the second year, (1804) he "had been suffering severely from a neuralgic affection"; opium was recommended by a college friend, and in it he discovered "a panacea" as he exclaims, "for all human woes." He was for some years "an occasional, rather than a constant devotee" of the drug.

"His love of roaming over the hills and valleys" was noticeable. He disappeared from Oxford, and after some years of travel, etc., he settled at Grasmere in 1809, aged 24.

"He was capable of undergoing great fatigue and took constant exercise."

"He loved long walks, and had a keen interest in sport." He walked much at night.

"In 1812 I suffered an attack of nervous horror which lasted for five months, and which went off in one night as unaccountably as it had first come on in one second of time."

In 1813 the irritation of the stomach recurred with such intensity that he increased the doses of opium he had been taking intermittently since 1804.

He now took 340 grains of opium or 8,000 drops of laudanum a day, a little more than half what Coleridge was taking at the same time.

In 1814 he reduced the dose to 40 grains a day, and in 1816 he felt he had so conquered the habit that he could marry.

In 1817-18 he grew worse, was in a bad way, and there was an increase of the opium again.

In 1821 he conquered the habit again, but he became "ill," "depressed in spirits," "dejected," "the liver deranged," with "derangement of the liver," etc., and in 1823-24 he again fell under the sway of opium.

In 1825 he wrote: "I am quite free of opium, but it has left the liver, which is the Achilles heel of almost every human fabric, subject to affections which are tremendous for the weight of wretchedness attached to them."

"Anxiety seizes on some frail part about the stomach, and produces a specific complaint which very soon abolishes all power of thinking at all." (1825.)

By 1840 he had been led to deeper relapses into opium than he had known between 1827 and 1837. "His misery was great." By 1844 he was taking 5,000 drops of laudanum a day.

He once more set himself to subdue the indulgence. "His constant careful jottings of graduated reductions day by day—his patient records of the effect of ordinary articles of diet, his measured round of exercise, amounting to 15 or 20 miles a day, all are touching in the agony that may be read between the lines." He reduced the amount of opium to six grains a day at one time.

"With a measured space of 44 yards in circuit, so that 40 rounds were exactly required for one mile, I had, within 90 days, walked 1,000 miles." (1844.)

"For six months" (reform as to laudanum and keeping up with the walking) "no results," "absolute desolation," "misery so perfect," etc.

After eight months of "this system" he recovered "in a moment such a rectification of the compass as I had not known for years." He was unable to leave off laudanum altogether, however.

"He almost entirely overcame his craving for opium, and enjoyed an old age of quiet and repose."

De Quincey never believed his trouble was due to opium, and expressly states this several times. For instance: "Is there any key, you will say, to its original cause? Sincerely, I

do not believe there is. One inevitable suggestion occurred to everybody consulted, viz., that it might be some horrible recoil from the long habit of using opium to excess. But this seems improbable from more reasons than one," especially as before any considerable use of opium he had had "an unaccountable attack of nervous horror," etc.

• In 1847 he speaks of a "famishing," an "extreme lack of appetite, or "incapacity for food," "a system utterly famished of all nutriment." "Utter prostration seized me, and which 'is far worse, utter nervousness," "this is the reason I have not written," "I have been very ill and am only just mending."

In 1848 he abstained wholly from opium for 61 days but returned to its "moderate use" as the lesser of two evils.

"I suffer from a most afflicting derangement of the nervous system, which at times makes it difficult for me to write at all." (1850.)

"The ten last years embrace a period of quiet and steady activity."

"My father's habits were simple, almost to asceticism. From the neuralgic suffering which led to his first taking opium, he early lost all his teeth, and from the extreme delicacy of his system, he could eat nothing less capable of perfect mastication than bread, so that only too often a little soup or coffee was his whole dinner." (His daughter.)

"Even at 70 years of age he was active and vigorous, and easily outwalked me, though I was a much younger man" (Hogg). At this time he walked nine or ten miles daily for exercise.

"For some weeks my eyes had given me so much pain, and consequently so much anxiety about the result," etc. . . .

"Now" (through intermission, perhaps, of candle-light reading) "my eyes are again better." (De Quincey in undated letter, p. 45, Volume II., Page's "Life"; after 1850.)

"A nervous malady of a very peculiar character which has attacked me intermittently for the last eleven years." (*Ibid.*, page 48.)

"I have suffered much from my eyes since the influenza; some days all but blind, and on some nights roused up for hours by the pain, and still more by the nervous uneasiness besieging them. Sulphate of zinc is all the remedy I have applied." (1855.)

"The act of stooping has for many years caused me so much illness." . . . "The *stooping* kills me." (About 1856.)

"Whether the fault is in some growing defect of my eyes, or in the badness of such lights as I can command," etc. . . .

"The letter cost me three-quarters of an hour, *under bad candle-light*, to decipher." (Perhaps about 1859.)

He was convinced that his "dreaming tendencies were constitutional, and not dependent upon laudanum."

According to his own statement (and no man could be more truthful) he had four relapses into the opium habit, 1813 to 1816, 1817 to 1818, 1824 to 1825, and 1841 to 1844. At other times, and after 1844 his use was "moderate, not excessive."

"He deliberately records his conviction in the latter years of his life, that but for opium he would have been in his grave 30 years before. As to opium in itself and taken in due limit, he will acknowledge nothing save benefit." (Page.)

"Opium helped to keep active and entire, during so many long years of bodily feebleness, that large and constantly working brain—that in a word it fed it—I have no manner of doubt, and further, that the almost singular immunity Mr. De Quincey enjoyed from headache, which in the course of his long life he never knew—a common source of annoyance, oftentimes of misery, to ordinary-living students—was likely enough due to the opium, I also believe. (Dr. Begbie, who attended him in his last illness.)

"I generally found him attempting to read without spectacles, which he never employed." (*Ibid.*)

"He listened with great interest to what was read to him from the morning papers, if he was not able to read himself. . . . When tired of reading, he was read to by, etc. . . . Day

after day books were handed in; these, when unable to read, he nevertheless carefully examined." (*Ibid.*)

"To the last he was able to read without the help of spectacles—one eye doing all the work, the other one being invariably closed while either reading or writing." (His daughter.)

He died in December, 1859, in his seventy-fifth year, "his death being ascribed rather to exhaustion of the system than to specific disease." There was no necropsy, although he offered his body to "the gentlemen of Surgeon's Hall."

He preserved to the last his exquisite and sane humor, his pathetic sympathy with all suffering beings, his self-forgetful generosity, his childlike or childish indifference to himself and the care of his person, his almost unrivalled power of intellect and of writing lucid English, and the graciousness and sweet urbanity that charmed all with whom he spoke.

His picture prefixed to the Life by Page is "from the portrait by Mr. James Archer, R.S.A."

There is an Appendix to Mr. Page's inaccurate and unworkmanlike biography of De Quincey, entitled "A Medical View of Mr. De Quincey's Case" by Surgeon Major W. C. B. Eatwell, M.D., F.R.S. Dr. Eatwell adopts an old method of clearing up a mystery, viz.—explaining a thing by naming it with an inexplorable word. He is sure the patient suffered for a great period of his life "from a terrible and distressing affection of the gastric nerves called gastrodynia." To this neuralgic affection was superadded "gastric ulcer of the mucous membrane of the stomach, healing under opium and the regulation of diet, and recurring when the stomach was not carefully managed." Dr. Eatwell writes: "I think this theory is borne out by the circumstances and exciting causes attending the outbreak of the attack (commencing probably under the diet of hips and haws in Wales) and by the subsequent symptoms. Dr. Brinton, in dealing with the causes of this complaint, writes that the disease 'seems to fall with disproportionate severity and frequency on those who suffer from the ill im-

plied by penury, excessive toil, insufficient and unwholesome food, foul air, mental anxiety, and those habits of intemperance which are the effect as well as the cause of such misery.' The last of these agencies," continues Dr. Eatwell, "we leave out of consideration; but the remaining agents in the catalogue of evils had undoubtedly exerted their full influence on the helpless boy, De Quincey."

If we suppose that, as stated, these are the causes of gastric ulcer, then surely De Quincey had it not, because, in addition to making an exception of intemperance, Dr. Eatwell should have also excepted all the other etiologic factors named. Except for a little while, and wholly without injury permanent or organic (indeed with benefit), De Quincey never was subject to "penury" or "insufficient and unwholesome food" and so far as "excessive toil," "foul air," and "mental anxiety" are concerned, they never had much share in his lot. This is all "words, words, words." The theory of "gastrodynia" plus gastric ulcer is not of sufficient strength to justify refutation.

In 1827 Carlyle, then 32 years of age, wrote to his brother John as follows:

"De Quincey was here last Wednesday and sate until midnight. He is one of the smallest men you ever in your life beheld, but with a most gentle and sensible face, only that the teeth are destroyed by opium, and the little bit of the underlip projects like a shelf. He speaks with a slow, sad, and soft voice, in the politest manner I have almost ever witnessed and with great gracefulness and sense, were it not that he seems decidedly given to prosing. Poor little fellow! It might soften a very hard heart to see him so courteous, yet so weak and poor. . . . He is an innocent man, and, as you said, extremely *washable away*."

I have introduced this quotation as a little portrait and because of its diverse illustrativeness. In the first

place it better testifies than all of his other contemporaries combined as to De Quincey's marvelous charm. How exquisite it must have been when he was able thus to soften the heart of *Ursa Major*! It speaks clearly of the character of both men. At this time De Quincey, aged 44, was going through one of the most critical periods of his life and of his addiction to opium. There is something inexpressibly pathetic that these great men, so different from one another, yet so alike, suffering as I believe from the same disease, a disease that wrought in each the profoundest of tragedies, and yet, like unrecognized brothers, they looked into each other's eyes, knowing neither of the other's way and woe.

It is a pity and not a little strange that Carlyle should have fallen into the stupid error he did as regards the cause of De Quincey's loss of teeth. Opium does not produce dental caries nor loss of teeth. De Quincey's daughter avoids this childish mistake, but came little nearer the truth by saying that the loss of teeth was due to the neuralgic suffering which led to his first taking opium. Carlyle's incidental remark is of value only as showing the opinion of those with whom he talked as to De Quincey and thus showing the haphazard manner in which everything peculiar to the man was ascribed with ridiculous indiscriminatioⁿ to opium. A similar misreading, indeed, of his whole life-tragedy seems to me perfectly apparent when we look over the

entire clinical biography with unprejudiced and philosophic minds.

I wish first to emphasize that a careful study of De Quincey's mind and writings brings out the clearest conviction that even about himself and even in matters pathologic (of which one would naturally think him hazy, at least as much so as any litterateur and layman) De Quincey never loses a marvelous sanity, lucidity, and discrimination. The lines of distinction, reserve, and consciousness—lines that are not observable, or that are faint to the ordinary eye—are yet most sharply drawn and seen by this subtle beautiful intellect. There is never an instant's doubt as to what is normal and what is not so, and, more even than the physicians that attended or wrote about him, I would trust his calm statements about these things. The superciliousness of the poor omniscients who affect to look down upon that sublime intelligence and ascribe everything to "opium, opium," is not to be weighed against his own lambent and penetrating keenness and rightness of observation. The soft gentle manner in which he states the facts as to his health and habits also heightens the effect of his clearness and accuracy of perception.

We note then that his dreamings which were later only intensified and sometimes morbidized by opium, were natural to him and began before his drug-taking. He himself was convinced that the dreaming tendencies were constitutional. A dispassionate examination of

the clinical facts of his life compel an ever increasing conviction that his addiction to opium was never a cause of his physical affliction; that, except in the case of the dreams of the "Confessions," it was not the cause of his mental peculiarities. The discrimination he drew may as a rule, be readily accepted. He never thought his troubles due to opium; he had nervous horror and other nervous symptoms before he took opium, and the spasmodic gastric, or rather intestinal, seizures he describes as beginning in 1802, show that the ultimate cause of his affliction was also at its horrible work before opium-taking, and in fact that it led directly to the opium as a means of relief. I think that it is literally true, as De Quincey thoroughly believed, that opium saved his life, enabled him to live and work, prevented his death at middle age, and on the whole, and when "taken in due limit" was of benefit to him. That, of course, is far from justifying its use by others and at the present time, and equally as far from admitting that a true cure does not exist for De Quincey's trouble, and for that of others due to the same cause.

The strange fatalism and impenetrable mystery of the true nature and source of his misery, was of course present to his own mind, but it was a problem too near at hand, too astonishingly near, to be even suspected. He stands before the Sphinx and asks: "Is there any key to its original cause? Sincerely I do not believe

there is." "One inevitable suggestion," etc., did not explain, was in fact, based upon error.

Something more than the unrivalled intellect stares at one in the fact that the 14-year-old boy was the best classical linguist in Europe, and that at the same time he was reading so omnivorously that he would sacrifice his allowance and go in debt for books. One's astonishment grows to the greatest marvelling when he finds that this lad was also an energetic and boyish fellow, most fond of outdoor life and activity. But now begin the silent palsyng blows of an unseen and most mysterious fate. The boy of 14 or 15 has to be taken from school "in consequence of a very alarming illness threatening his head." This lasted for more than a year, and was followed by a return of good spirits, though he continued to suffer much at intervals from headache. Again he was put to school, but three-fourths of the time he is out of health, not seriously ill, but worse, weary, torpid and languid. About this time begin the gastric "twitchings, the loss of sleep, and the increasing weakness." Finally, his sufferings and the lack of exercise, etc., could not longer be endured, and he breaks into absolute revolution, and at the age of 17 he borrows money, runs away to Wales, and lives a wanderer's life among the farmers and on the hills. His health gains, but his money does not, and he goes to London, where for a short time he finds out what real poverty means. Its power of logic probably de-

cided him to accept advice and to try study once more.

The tremendous influence of eye-strain upon disposition, character, and vocation, was borne in upon me the first year I was in practice.¹ Almost every day since then the truth has become more striking and evident. Children's lives and minds are unconsciously and constantly modified, always unnaturally and morbidly, because of the fact, unconscious to them, that reading and study and writing irritates and disorders the central nervous system, the digestional organs, etc. De Quincey could not escape his fate, but others do—and meet another, however! Every child's eyes should be periodically examined, under mydriasis, by an expert refractonist.

Much against his will young De Quincey consented to try to study once more, this time in Oxford. In his second year (1804) his severe neuralgic affection led him to try opium for the first time. With a less well-balanced mind than that of De Quincey, and especially if we remember his intense suffering, this method of treatment would at once have been equivalent to "throwing the baby away with the bath," but with De Quincey, although it at once gave a heavenly relief, he became only an occasional rather than a constant

¹ "The Psychological Influence of Errors of Refraction and of their Correction," *Medical and Surgical Reporter*, September 29, 1888.

devotee of the drug for nine years. His love of roaming over the hills and valleys was kept up at Oxford, but despite this, and also notwithstanding the opium, which indeed masked and relieved but could not cure the symptoms, least of all their cause, he again could not endure systematic and continuous study—he, *par excellence*, a born student and lover of books and study! He soon left Oxford and spent several years in objectless travel or wandering about, settling at last in 1809, aged 24, at Grasmere. Here were kept up the constant exercise, the long walks, the interest in sport, and the seemingly morbid solitary walks in the darkness of the night. Despite these things, in 1812 there was a suddenly appearing and as suddenly disappearing five months' attack of "nervous horror" and in 1813 such an increased intensity of the "irritation of the stomach" that for relief he increased the intermittent doses of opium he had been taking since 1804, until he was soon taking as much as 340 grains a day. He would not marry while taking so much, and by 1816 he had so far conquered the habit that he felt justified in marrying. This period of 1813–1816 was his first one of excess, but immediately after marriage his suffering became more unendurable and for a year he relapsed. His heroism in 1821 in again fighting and winning the battle was only rewarded by great suffering, dejection, "derangement of the liver," etc., and there followed another relapse into excess from 1824

to 1825. The last relapse was from 1841 to 1844. At other times and after this time there was moderate, not excessive use.

This history of his splendid struggle and success in 1844, his absolute abstention for 61 days in 1848, and his wise choice thereafter of moderate use as the lesser of two evils, his ten last years of life in "quiet and steady activity," are also noteworthy.

There are two factors that should not be lost from view: The first relates to the fact that a man so destined by nature and profession to the life of a scholar and writer as was De Quincey, must devote a certain portion of his time, of each day usually, to reading, writing, and revising proof-sheets. The second is closely related to it—mathematically so, one might say, as well as logically—and concerns the matter of physical exercise. No one who has studied the life of De Quincey (or the lives of the other men whom we are to observe later) seems to have adequately pondered, at least not to have asked for the significance of, the irresistible necessity these men were under to walk or exercise. Ocular accommodative effort and reflexes cease in walking almost entirely, and absolutely so in walking at night. All his life De Quincey walked many miles a day, walked in day and darkness, in sunshine or in rain, and in the worst time of trials he would walk round and round a ring, like a poor, dumb, driven animal, 40 rounds to the mile, from 400 to 500 times a

day. At the age of 70 he was still active and vigorous, outwalking younger men.

Another clear indication of the ultimate cause of De Quincey's affliction is given by noticing the dates of the relapses into opium-addiction. The first two are practically one, extending from 1813 to 1818, the second, 1824 to 1825, the third 1841 to 1844. Observant ophthalmologists know that in the life history of patients suffering from uncorrected eye-strain, or optical error, there tends to be three critical periods or crises. In girls and women these crises are of somewhat different ordering. Here I speak only of boys and men, and in them the first is at or within a few years of puberty. The second is in early adult life, the third comprises the period of the failure of accommodation extending normally from about 45 to 60, but varying according to the amount and kind of ametropia. In hyperopic or "far-sighted" astigmatism it begins five or even ten years earlier. In De Quincey's case the first crisis came at the logical age of 14, when he had to be taken from school because of the "very alarming illness threatening his head." Every oculist knows well enough about these ocular or ametropic headaches. They more seldom occur in boys and men than in girls and women. The reflex of eye-strain in the latter is usually to the head, with more or less implication of the digestional organs. In boys the tendency is to the eyes (styies, blepharitis, conjunctivitis, etc.),

while in men, especially in severe eye-workers, it is usually to the digestive organs alone. But there are many cases of modified or masked symptoms, depending upon the always varying conditions of the eyes, native vigor, external circumstances, etc. The noteworthy fact is the long-continued increased intensity of all reflexes during the failure of accommodation, and the sudden cessation of direct ocular reflexes at about 60. If the long-continued functional diseases of the digestive and cerebral centers have at that time not been too badly injured, there is peace for the rest of life. But if irreparable harm has been done them, symptoms will be changed but will persist. Of course, according to circumstances and conditions one period may extend into another, and the habit of drug-taking or the haphazard catching up of a pair of spectacles may modify but not abrogate the symptoms. In De Quincey's case the first critical period (head pains), plainly due to eye-strain, passed off in a year, but recurred in one form or another until he was compelled to run away from school and seek rest from eye-strain even by vagabondage if necessary, at all events by the walking or exercise which all such sufferers are unconsciously compelled to undertake. Of course, one so endowed as De Quincey could not escape the literary life, and his compromise with the unknown enemy that possessed him was opium and walking. The first hid and modified the results of eye-strain, the second gave the

health to resist, and the eye-rest demanded for recuperation.

In all severe eye-strain, insomnia, apparently due to a number of mysterious causes, is almost always a constant symptom. ("Kicks about at night and cries out in his sleep" is an almost invariable report of parents in astigmatic children.) How it affected De Quincey may be seen throughout the biography. At the age of 28 the "stomach and liver symptoms" became greatly intensified and the doses of opium became enormous. Love and marriage nerved him to moderation for a year or two, but continued and increased eye-work drove him again to his enemy-friend. During the two years of his greatest ocular labor in middle-life all his great strength of will to renounce opium entirely was in vain and indeed unwise. Even physicians are perhaps in this and similar cases too apt to forget the established clinical fact that the greater the pain and inflammation the higher the dose of the anodyne required. For example, in peritonitis doses of morphia may be, must be, given, a very small part of which would kill if the patient was in a normal condition. In De Quincey's case the anodyne in large doses was necessary to give him relief from the "misery," "gnawing," "the horrors," the "specific complaint," the "twitching," the "depression," etc., from which he suffered whenever he discontinued the drug. Notice that only at 62 was he able to discontinue it

entirely, but in two months found it wiser to continue its moderate use for the rest of his life. Notice also again that these last years were years of "quiet and steady activity."

Without a scrap of direct evidence as to the existence of eye-strain, a study of the clinical biography of De Quincey by a competent oculist should convince him that the mystery of De Quincey's life and disease, "the key to the original cause," as he puts it, of his suffering, was reflex ocular neurosis. Why then did his eyes not pain him and suffer? It is one of the greatest of unutilized truths, long known, strangely ignored, that in the vast majority of cases of eye-strain the morbid results of the astigmatism, etc., are not felt in the eyes. It is perfectly explainable why this is so. The value of the eye so overtops that of almost any other organ that the reflex results of its unphysiologic function must be shunted anywhere except back to the eye itself. In women it goes to the head, and the world is full of those tortured nearly every day of their life with headache and sick-headache ("bilious" or "nervous" headaches). In many, and especially in men working much with the eyes, the reflex is to the digestive organs, with "indigestion" and "liver derangements," "anorexia," etc. The truth that eye-strain induces these functional gastric, intestinal, and biliary disorders cannot much longer be ignored. When acted upon it

will constitute one of the greatest advances in practical medicine that has ever been made. In the meantime the supercilious indifference and ignoring of the fact is one of the awful expenses of life and an opprobrium of medicine.

We must not forget that in the days of De Quincey, Carlyle, etc., candles and rush-lights were the common sources of artificial light. When even our wonderful best modern lights are by no means equal to daylight, and are found taxing to weak and defective eyes, what must have been the degree of eye-strain in the days of candles?

At about 65 De Quincey's eyes began troubling him. When accommodation had been entirely lost, the morbid reflex could not be shunted elsewhere, and must be returned to the eyes themselves. He had "pain," which means, beyond question, inflammation of the external or visible parts of the eye. (Cataract and retinal inflammations are painless.) Stopping reading by candle-light naturally relieved him. It returned worse than ever and affected the cornea ("all but blind") and sulphate of zinc was the excellent remedy used. This conjunctival trouble continued to the end of his life, and in the last years most of the reading was done for him by others, reading aloud.

As I have said, the trained oculist would not need direct evidence of ametropia, etc., to convince him of the subtle source of De Quincey's affliction. But as

such positive evidence would aid in bringing conviction to the layman and to the ultra-conservative physician, he would welcome any such demonstration of the optical abnormality of this patient's eyes. Luckily it exists, and in a duplicate and mutually corroborative form. The first is the picture (reproduced herewith) of De Quincey, prefixed to the "Life and Letters" (by Page), made from the portrait by Mr. James Archer, R.S.A. In this, as any ophthalmologist, or even any observant layman, can see, the eyes are divergent. In sitting for a portrait in which the eyes are not directed ("centered") upon the spectator, they naturally fall into a position of noninnervation, described as "at rest," "fixed upon vacancy," or "looking at an infinite distance." When the external ocular muscles are balanced ("orthophoria," "parallelism," etc.), the axes unite at a far point such as a star, the horizon, or at twenty feet distance. When there is imbalance of the muscles ("heterophoria," "squint," "strabismus") there is no such uniting of the axes in a state of rest or noninnervation. Naturally in sitting for the painter De Quincey's eyes took this position—literally one of rest, and it speaks much for the painter's fine ability that he painted the truth as he found it. That truth was that De Quincey had what the American oculist calls "exophoria," and the European names "insufficiency of the interni." It is not squint or strabismus, at least not permanently that, but so far

as symptoms go it is infinitely worse than permanent divergence. The eyes, or one eye, is not always divergent, or turned out, but only when attention and "fixation" are not aroused. Then, as in the portrait, it is manifest. At other times the eyes appear, and are, normally "fixing." That De Quincey had not divergent strabismus is all but certain, because many—at least Carlyle!—would have described the striking fact. Naturally none but the painter would record the fact of the divergence of the eyes at rest.

Our own attention is interestedly fixed, also, by a perfect bit of corroborative testimony—the statement that De Quincey in his later years used but one eye when reading and writing, the other "being invariably closed." If this unused eye had been always or permanently divergent it would not have been closed, because it would have been blind, amblyopic, or its visual activity psychically ignored (as all oculists understand) so that there would have been no need of shutting it out by the closed lid. Fixation in "near work" with it was in the late years so tiresome that nature must allow it to diverge. That this eye had fair vision is shown by the fact that the conflicting double image (in divergence) had to be extinguished by closing the lid. That this closing of one eye in reading and writing was adopted late in life is demonstrated by the two facts, that it was not amblyopic (required lid closure), and that there was no

permanent "ptosis," or paralytic closing of the lid. Even to his death both eyes were "open" when looking at any person, or at a distance. When looking at a book, etc., after accommodation failed, there could not be the double convergence required except by a straining effort greater than that required to hold one lid closed.

A capital proof of all this, moreover, is offered to us in the statements of his daughter and of his physician that even at 74 he never used spectacles for reading. We now know that even with the best application no spectacles that any person could have obtained at that time would have completely relieved eye-strain. Ophthalmology at that time had not risen to its splendid opportunity. It has only done so exceptionally to-day. To its disgrace operations and inflammatory diseases still occupy the specialist's attention too exclusively. Spectacles of the crudest kind were discovered only about 500 years ago and science and some scientific men seem often inclined to ignore for another 500 years their use and improvement in correcting the optical defects of the eye that looks through their infinitely studied and perfected microscopes. But all the lenses of all the opticians of that country and time would not have helped poor De Quincey. Why? Because he had myopic astigmatism, and of some anomalous and anisometropic variety. Had he not been afflicted with this optical fault of his eyes, he could

not have read a line of any book at the age of 70. It should also be noted that the opium he took would produce myosis, or narrowing of the pupil to a "pin point" diameter. This would also greatly aid him in shutting out the confusing rays or diffusion circles, caused by astigmatism, and would thus, in a way, make his vision better. Unconsciously this fact may also have aided in the addiction to the opium-habit itself. Up to the age of about 62 he was able to preserve binocular vision, but at an expense to his nervous and digestional system which was essentially the cause of his opium habit, and of all his suffering.¹ At any time of his life a proper pair of spectacle lenses would have relieved De Quincey of his sufferings, would have enabled him to quit opium-taking, and would have allowed him to pursue a far more wonderful literary career.

- Even with De Quincey's incomparable brilliancy and accuracy of insight he could not have divined all this. How near to it he came, however, is to be found in a number of selections from his writings. If he could have suspected that the source of the disorders of "the whole process and elaborate machinery of digestion" in his case was in that most delicate, important, and wonderful organ of vision, he would probably have

¹Dr. Begbie thinks De Quincey's immunity from headache was due to the opium. He did not know that myopic patients do not have headache.

made the following passage even more beautifully powerful and pathetic than it is: "The whole process and elaborate machinery of digestion are felt to be mean and humiliating, when viewed in relation to our mere animal economy. But they rise into dignity, and assert their own supreme importance, when they are studied from another station, viz., in relation to the intellect and temper. No man dares then to despise them. It is then seen that these functions of the human system form the essential basis upon which the strength and health of our higher nature repose, and that upon these functions chiefly, the genial happiness of life is dependent. All the rules of prudence, or gifts of experience that life can accumulate, will never do as much for human comfort and welfare as would be done by a stricter attention, and a wiser science, directed to the digestive system."

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• CARLYLE. •

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CHAPTER II.

• THOMAS CARLYLE.

THE formidable number of the following excerpts, should not deter the reader, if at all interested in the subject, from attentive consideration of each. I have omitted a hundred or more which were merely general expressions, or repetitions of these, in order to reduce the space as much as possible. But, for one reason or another, I think every line quoted has some special significance in helping to give a thorough understanding of the clinical biography of the patient:

Thomas Carlyle was born December 4, 1795.

At the age of 23, says Froude, "he was attacked with dyspepsia, which never wholly left him, and in these early years soon assumed its most torturing form, 'like a rat gnawing at the pit of his stomach.'" At this time he says of himself, just entering upon "the three most miserable years of his life," he was fast losing his health (while a student in Edinburgh), "a prey to nameless struggles and miseries, which have yet a kind of horror in them to my thoughts, three weeks without any kind of sleep, from impossibility to be free from noise."

"In sickness of body and mind," "dyspepsia had him by the throat," "irritable," "gey ill to live wi'," etc., are further descriptions of these years.

"I enjoyed any amount of walking in those young years."

"Bad health does depress and undermine one more than all other calamities put together." (24 years of age.)

"With stupidity and sound digestion man may front much." (25.)

"It is these 'coarsed nervous disorders.' If I had but strong health!" (26.)

"In spite of all my dyspepsias, and nervousness and hypochondrias." (27.)

"He had been working hard on Schiller and Meister. He had been complaining of his health again." (28.)

"Is Tom got better? Does he sleep well yet? It gaed to my heart when he told me in the last letter that he couldna sleep without his finger in his ear." (His father.)

"I sleep irregularly here, and feel a little, very little, more than my usual share of torture every day. What the cause is would puzzle me to explain. I take exercise sufficient daily; I attend with rigorous minuteness to the quality of my food; I take all the precautions that I can, yet still the disease abates not." (28.)

"Wrecked with want of sleep."

"Ill-health, the most terrific of all miseries."

"A state of health worse than ever it was."

"I was consulting doctors who made me give up my dear nicotine, and take to mercury."

"Grown 'sicker and sicker. . . I want health, health, health. On this subject I am becoming quite furious. . . If I do not soon recover, I am miserable forever and ever. They talk of the benefit of ill-health from a moral point of view. I declare solemnly, without exaggeration, that I impute nine-tenths of my present wretchedness, and rather more than nine-tenths of all my faults, to this infernal disorder in the stomach." (Aged 28, at work on Meister.)

"These drugs leave me scarcely the consciousness of existence. . . There is mercurial powder in me, and a gnawing pain over all the organs of digestion, especially in the pit and left side of the stomach." (*Ibid.*)

"Stupid, unhappy, by fits wretched, but also dull—dull and very weak." (*Ibid.*)

“‘A long hairy-eared jackass,’ as he called some eminent Edinburgh physician, had ordered him to give up tobacco, but he had ordered him to take mercury as well; and he told me that along with the mercury he must have swallowed whole hogsheads of castor oil.” (*Ibid.*)

“On days when moderately well, I feel as happy as others; happier, perhaps.”

“... A Mr. Badams, a graduate in medicine, though his business is in chemical manufactures in Birmingham, ... is one of the most sensible, clear-headed persons I have ever met with. ... After going about for a day or two talking about pictures and stomach disorders, in the cure of which he is famous, and from which he once suffered four years in person, what does the man do but propose that I should go up to Birmingham for a month and live with him that he might find out the make of me, and prescribe for my unfortunate inner man. I have consented. ... Of his skill in medicine I augur favorably from his general talent, and from the utter contempt in which he holds all sorts of drugs as applied to persons in my situation. Regimen and exercises are his specifics, assisted by as little gentlest medicine as possible. On the whole, I think I never had such a chance for the recovery of health. ... I am going to take books and read,” etc. (28.)

Eight weeks with Badams brought no relief. “The contempt of drugs which Badams had professed in London had been rather theoretic than practical,” says Froude. Carlyle puts it thus: “I have been bephysicked and bedrugged. I have swallowed about two stoupsfuls of castor oil since I came hither; unless I dose myself with that oil of sorrow I cannot get along at all.” Badams wished him to come back “for another month until he had completed his doctorial and castor oil system with me. Some of Badams’ drugs had not prospered with me, and I fell below par in point of health.” (29.)

Badams himself took to drink, as described by Carlyle six years later, “for the sake of an intolerable headache which brandy was wont to cure,” and soon “died miserably.”

The complaints of "bad stomach," "bad health," etc., now became frequent and bitter, and the passionate resolves to get health most pathetic.

"Could I live without taking drugs for three months, I should even now be perfectly well." (29.)

Upon his farm at Hoddam Hill he improves. "Long solitary rides on my wild Irish horse Larry, good for the dietetic part." He steadily gains in health, "and for my occupations (*i. e.*, literary work) they amount to zero." "It is rather a holy time, a *pax Dei* which exhausted Nature has conquered for herself." (29.)

He threw himself into a course of wide and miscellaneous reading, and at the time of his recent marriage and settlement in London, he asks, "Why am I not happy then? Alas, Jack, I am bilious. I have to swallow salts and oil; the physic leaves me pensive yet quiet in heart, and on the whole happy enough; but the next day comes a burning stomach and a heart full of bitterness and gloom." (31.)

"Sick with sleeplessness, nervous, bilious, splenetic, and all the rest of it." (*Ibid.*)

"Beggary want of hope." (*Ibid.*)

"It is strange how one gets habituated to sickness." (*Ibid.*)

"The new book is going at a regular rate. . . . Oh, that ~~he~~ we were indeed well." (Mrs. Carlyle.)

"I fight with dullness and bile in the forenoons as of old." (He worked in the forenoon and "walked diligently" in the afternoon.)

"I have been in considerably better health ever since I came to Craigenputtock and found my red chestnut Irish doctor saddled, waiting for me in his stall." (33.)

"None can say how bilious I am, and am like to be; but I have begun to ride daily on Larry, and so Jeffrey shall have his article at the appointed time." (33.)

"He went out in all weathers, indifferent to wet, and in spite of his imagined ill-health, impervious to cold." (Froude.)

"You cannot figure the stillness of these moors in November

drizzle. Nevertheless I walk often under cloud of night, down as far as Carstammon Burn, sometimes to Sandy Wells," etc. (33.)

"He took his nightly walks on the frozen moor." (Froude.)

"Farthing rushlights for illumination after dark." (At Craigenputtock, aged 36.)

"Mrs. Carlyle's faith in physicians is somewhat on a level with my own; that she will give them no more of her blood, but trust to exercise, diet, and the return of settled weather." (36.)

"His health was essentially robust." (Froude.)

"My husband is as good company as reasonable mortal could desire. Every fair morning we ride on horseback for an hour before breakfast." (Mrs. Carlyle.)

"I am better resting. I had made myself bilious enough with my writing, and had need to recover as I am doing. (At Edinburgh, aged 38.)

"Her complaint (Mrs. Carlyle) seems like mine, a kind of deep-seated dyspepsia; no medicine is of avail, only regimen (when once one can find it out) free air and, if that is possible, cheerfulness of mind." (*Ibid.*)

"I, when I take walking enough, get along as I was wont in that particular. Continued sickness is a miserable thing, yet one learns to brave it." (39.)

"The world is God's world, and wide and fair." (*Ibid.*)

"The history of the French Revolution, the most powerful of all his works, and the only one which has the character of a work of art, was the production of the mind which he brought with him from Craigenputtock, undisturbed by the contradictions and excitements of London society and London triumphs. Poverty, mortification, and disappointment had done their work upon him, and he had risen above them, elevated, purified, and strengthened." (Froude, upon Carlyle leaving "the six years' imprisonment on the Dumfriesshire moors.")

"He had laid in, too, on the moors a stock of robust health. Lamentations over indigestion and want of sleep are almost

totally absent from the letters written from Craigenputtock. The simple natural life, the wholesome air, the daily rides or drives, the poor food, . . . had restored completely the functions of a stomach never so far wrong as he had imagined. . . . Afterwards he was always impatient, moody, irritable, violent. These humors were in his nature, and he could no more be separated from them than his body could leap off its shadow. . . . He looked back to it as the happiest and wholesomest home that he had ever known. He could do fully twice as much work there, he said, as he could ever do afterwards in London." (Froude.)

"I read dozens of pages and find at the end that I have not the slightest knowledge what they were about." (39, in London.)

"Mood tragical, gloomy, as of one forsaken." (*Ibid.*)

"Bad health, too (at least singularly changed health), brings all manner of dispiritment." (*Ibid.*)

"Weary, dispirited, sick." (*Ibid.*)

"All of us have tolerable health. . . . I am diligent with the shower-bath; my pilgrimages to the museum and on other town errands keep me in walking enough." (*Ibid.*)

"Bilious, too, in these smothering windless days." (*Ibid.*)

"Broke down in the park; *könnte nichts mehr*, being sick and weak beyond measure." (*Ibid.*)

"Many days of suffering, of darkness, of despondency. . . . Ill-health has much to do with it." (*Ibid.*)

"His name was not seen on charity-lists, but he gave away every year, perhaps half what he received. (Froude.)

"All the mornings he was at his desk; in the afternoons he took his solitary walks in Hyde Park, seeing the brilliant equipages, and the knights and dames of fashion prancing gaily along the Row." (*Ibid.*)

"His impatience, his irritability, his singular melancholy, . . . were the effects of temperament first, and of a peculiarly sensitive organization; and secondly of absorption in his work," etc. (Froude.)

"The first book of the French Revolution is finished. Soul and body both very sick." (40.)

"If literature will refuse me both bread and a stomach to digest bread, then surely the case is growing clear." (40.)

"If Providence ever did warn, it warns thee to have done with literature, which will never yield thee bread, nor stomach to digest bread." (Of himself, aged 40.)

"The pipeclay state, as Carlyle has designated a state too common with those who are too well furnished with bile." (Mrs. Carlyle.) • •

"Occasionally sharp pain (something cutting or hard grasping me around the heart). . . . Something from time to time tying me tight as it were, all around the region of the heart, and strange dreams haunting me." (40.)

"My sight inward, as well as outward, is all as if bedimmed." (40.)

"I am yellow and thin, and feel that a rest will be very welcome and beneficial." (40.)

"'The accelerated speed' slackened to slow, and then to no motion at all. He sat daily at his desk, but his imagination would not work. . . . He locked up his papers, and sat for a fortnight reading novels. . . . He would be idle, he would rest. He would try, if the word was not a mockery, to enjoy himself." (Froude.)

"My bodily health is actually very bad. . . . I am full of dyspepsia, but also of hope. . . . No work to-day, as of late days and weeks." (40.)

"He wrote 'with his heart's blood' in a state of fevered tension." (Froude.) •

"My poor nerves, for long months kept at the stretch, felt all too waste, distracted. . . . That things should come to a crisis is what I wish."

The fortnight's idleness expired. He had seen many friends, he had walked and sat in the park. The novels had proved without charm. He writes now of "the perceptible increase of health this otherwise so scandalous *faulenzen* (idleness)

had given him;" he went to work again on the lost volume, but became so sick that he still made little progress.

He managed to complete the volume, locked it up, felt "like a man who had nearly killed himself in accomplishing zero," and went to Scotsbrig, where he talked and smoked and "walked far and fast among the hills." "Health is greatly improved since I got hither. Alas! the state of wreckage I was in, fretted to fiddle-strings, was enormous. Even yet after a month's idleness, and much recovery, I feel it all so well." (40.)

Even at Scotsbrig "a little overwork hurts me, and is found on the morrow to be quite the contrary of gain."

Returned to Chelsea, Froude says of his health: "Nothing was essentially the matter, but he slept badly from overwork. Toil was as severe as ever." With work his health grows worse; "physical pain is bad dispiritment. . . . It many-times strikes me, being in ill-health and so miserable, art thou not of a surety wrong? Why not quit literature? . . . I am weary almost of life itself." (41.)

"Went out and had long swift-striding walks—till ten—under the stars. . . . The unrested horse or writer cannot work. . . . Have had two or three days of the most perfect rest now. . . . Have finished Chapter I, . . . and gone idle for a week after, till as usual, I am now reduced to a caput mortuum again." (41.)

"My printers had only ceased the day before; I was wasted and fretted to a thread. My tongue, let me drink as I would, continued as dry as a charcoal." (42.)

"My health is not fundamentally hurt. Rest will cure me. I grow better daily. I delve, I walk much, generally alone through the lanes and parks." (42.)

"He fled to Scotland fairly broken down. He had fought and won his long battle. The reaction had come, and his strangely organized nervous system was shattered." (Froude, June, 1837.)

"My soul's one wish," he writes from Scotland, "is to be

left alone, to hear the rustle of the trees, the music of the burn, and lie vacant, as ugly and stupid as I like. . . . I am doing nothing; witnessing nothing. My stupidity is great. . . . They say I am growing better, looking better." "With talk and locomotion, the days pass cheerily." (42.)

Returned to Chelsea, he attended "a party" and returned about one in the morning, "with a headache that served me for more than a day after, . . . sick and nervous." He "did nothing all winter." (43.)

There is a shivering precipitancy in me, which makes *emotion* of any kind a thing to be shunned. "It is my nerves, my nerves. . . . Such a nervous system as I have. . . . Thomas feeling in his breast for comfort and finding bilious fever. . . . All palpitating, fluttered with sleeplessness and drug-taking, etc. . . . Weary and worn with dull blockheadism; chagrin (next to no sleep the night before)." (43.)

"Nothing keeping him in health so much as riding." (43.)

"Dyspepsia working continually. . . . Dispirited, in miserable health. . . . Ride daily. . . . Swift riding and solitude. . . . For two hours every day I have almost an immunity from pain. . . . Health perceptibly improved. I have distinctly less pain in all hours." (44.)

"Going into society" was "at the cost of a shattered set of nerves and head set whirling for the next 48 hours." (45.)

"I pass my days under the abominable presence of physical misery—a man foiled. I mean to ride diligently for three complete months, try faithfully whether in that way my insupportable burden and imprisonment cannot be alleviated into at least the old degree of endurability." (45.)

"I am sick and very miserable. I have kept riding for the last two months. My health seems hardly to improve. I have been throwing my lectures upon paper. . . . If I were a little healthier,—ah, me! all around would be well." (45.)

"A head *full of air*; you know that wretched physical feeling; I had been concerned with drugs, had awakened at five, etc. It is absolute martyrdom." (45.)

At the height of his success, complaints grow more bitter; he longed to be in the country; "I shall never be other than ill, wearied, sick-hearted, etc. . . . Bilious, heartless and forlorn. . . . Sick, sleepless, driven half mad." (His horse had been given up as too expensive.)

"My reading goes on; my stupidity seems to increase with it more and more. . . ." Walking and solitude are "indispensable" for health. "I am sure to be sick everywhere," (45.)

"One asks with wonder why he found existence so intolerable. . . . He was now successful far beyond his hopes. The fashionable world admired and flattered him. The cleverest men had recognized his genius, and accepted him as their equal or superior. He was listened to with respect by all; and, far more valuable to him, he was believed in by a fast increasing circle as a dear and honored teacher. His money anxieties were over. If his liver occasionally troubled him, livers trouble most of us as we advance in life, and his actual constitution was a great deal stronger than that of ordinary men. . . . Why could not Carlyle, with fame and honor and troops of friends, and the gates of a great career flung open before him, and a great intellect and a conscience untroubled by a single act which he need regret, bear and forget too? Why indeed! The only answer is that Carlyle was Carlyle." (Froude.)

"Want of rest in the past summer had upset Carlyle's internal system. Work he could not." He went to Fryston. "My hope and expectation is that I shall improve in health here." (46.)

But, "there was no help for it; he had to do what in the past year he knew he must do, allow himself a season of complete rest and sea air." At Scotsbrig: "I grow daily better, and am really very considerable recovered now." (46.)

The meaning of the word, *idle*, to Carlyle, is to be kept in mind. Note that reading is never wholly discontinued. While at Scotsbrig lazy and idling, he writes in his journal: "Much

French rubbish of novels read, a German book, etc. Nothing read, nothing thought, nothing done." Reading was only relatively less, and out-of-door life far greater than usual. Later he says, "I do not read much."

"I cannot be healthy anywhere under the sun." (47.)

"What a pity a man cannot sleep, and so live something like other men. . . My sleep was a sleep as of hospitals, of men in a state of asphyxia, a confused tumult, a shifting from headache to headache." (*Ibid.*)

"No man was lately busier, and few sicklier, than I now am. Work is not possible for me except in a red-hot element which wastes the life out of me. I have still three weeks of the ugliest labor (correcting proofs), and shall be fit for a hospital then." (48.)

"The lassitude that always followed the publication of a book." (Froude.)

"Past and Present" was completed in February, 1843, and after six months of resting and touring he had at Scotsbrig, in August, "no appetite for writing, for speaking, or in short, doing anything but sitting still as a stone." (48.)

"These were times when Carlyle was like a child and a very naughty one." "His work would not go, . . . his task seemed impossible." (Froude, after the return to Chelsea in October.)

"The dinner hour was changed to the middle of the day to improve the biliary condition. No result came. He walked about the streets to distract himself." "So it was, is, and must be with every serious man when he is first starting upon any great literary work." (49.)

"Above a hundred museum headaches." (49.)

"My progress in 'Cromwell' is frightful. I am no day absolutely idle, but the confusions that lie in my way require far more force of energy than I can muster on most days, and I sit, not so much working as painfully looking on work." (49.)

"Lack of sleep and dull headache. Very stupid." (49.)

"As a preliminary" (to finishing "Cromwell," and getting

away on the road) "I have started to-day, by—a blue pill and castor." (49.)

"The devil of sleeplessness and indigestion." (49, just finishing "Cromwell.")

"Cromwell thus disposed of (August 25) he was off to Scotland . . . dreadfully bilious, and almost sick of his life." (Froude.)

"Then troublesome proof sheets came which would stir the bile a little." "I seem to improve in health a little, but still do not sleep. The habit of utter idleness getting possession of me is very strange." (50.)

"Very unwell;" "sleepless," "totally idle, trying merely, to read books, and the books a disgust to him." (51.)

"A huge nightmare of indigestion, insomnia, and fits of black impatience with myself and others,—self chiefly. . . . I am heartily sick of my dyspeptic bewilderment and imprisonment." (52.)

"For two years now I have been as good as totally idle, composedly lying fallow. It is frightful to think of. After getting out of 'Cromwell' my whole being seemed to say, more sulkily, more weariedly than ever before, 'What good is it?' I am wearied and near heartbroken. Nobody on the whole *'believes my report.'*" (53.)

"Never till now was I so low—utterly dumb this long while, barren, undecided, wretched in mind." "Never spent five lonelier, idler weeks." (54.)

"Little done hitherto, nothing definite done at all." (54.)

"My work needs all to be done with my nerves in a kind of blaze; such a state of soul and body as would soon *kill* me, if not intermitted." "I have to rest accordingly; to stop and sink into total collapse, to get out of which again is a labor of labors." (54.)

"I am getting *weary* of suffering, feel as if I could sit down in it and say, well then, I shall soon die at any rate." (55.)

"I had no idea I was so sick of heart and had made such progress toward age and steady dispiritment. Alas! alas! I

ought to be, wrapped in cotton wool, and laid in a locked drawer at present. I can stand nothing. I am really ashamed of the figure I cut," etc. (55.)

"Robust constitutional strength . . . was not among the gifts which Nature had bestowed upon Carlyle." (Froude.)

"In hope, desire, or outlook, so far as common mortals reckon, such, I never was more bankrupt." (55.)

He had been prevailed to sit for his portrait: "No more abominable blotch, without one feature of mine. . . . It is the portrait of an idiot that has taken Glauber's salts and lost his eyesight. We burn it and forget it." (56.)

• He fled to Malvern for the water-cure, and became, with his wife for a few weeks the guest of Dr. Gully. . . . The bathing, packing, drinking, proved useless—worse, in his opinion, than useless. 'He found by degrees that water, taken as a medicine, was the most destructive drug he had ever tried.' He 'had paid his tax to contemporary stupor.' . . . He hastened to hide himself in Scotsbrig, full of gloom and heaviness, and totally out of health." (56.)

"Although beginning 'Frederick' he is glad to get home to a *slighter* measure of dyspepsia, inertia, and other heaviness, ineptitude and gloom." (57.)

• "Writing of all kinds in these sad biliary circumstances, with half-blind eyes." (57.)

During the trip to Germany loss of sleep is complained of, but "on the whole, was not so unhappy after all." "He could not conceal that he was pretty well, and had nothing really to complain of." (57.)

"My survey of the last eight or nine years of my life yields little 'comfort,' etc. "Health miserable;" "diseased liver;" "cannot yet learn to sleep well. . . . For the rest, I guess it is a *change of epoch* with me, going on for good perhaps. I am growing to perceive that I have become an old man." (57.)

"She (Mrs. Carlyle) reads now with *specs* in the candle-light, as well as I; uses her mother's specs, I perceive," etc. (58.)

"Here are now ten years, and what account can I give of them? The work done in them is very small, even in comparison." (58.)

"I really feel almost better than I have done in late years; . . . it is strange how little decay I feel; nothing but my eyesight gone a very little." (58.)

The sensitiveness to noise continues—"the great cock question" is settled, but "Frederick" does not make the headway desired, because he is "in a heavy stupefying state of health," and he is afflicted with terrible dreams. "Nearly all of my dreams in this world have come from bodily conditions of the nerves, I think." (59.)

"My eyes are very dim; bad light (from the sky direct) though abundant." (59.)

After eighteen months at "Frederick," "all things go prosperously," and he sleeps well. (60.)

"Doing really excellently well as regards health." (62.)

"Villainous headaches," "feverish headaches" come on with his proofs all day, but "the world was well; all was well," generally speaking, and "indoors the old affectionate days had come back." (62.)

At the completion of his six years' task (Frederick) he was "slightly out of health"; took a trip to Germany, "improves in bodily health, and sleeps well." (63.)

There are some complaints henceforth, of nerves, stomach, darkness, stupidity, etc., but they are not so frequent, nor by any means so passionate as formerly. He "worked without respite, rode except on walking days, chiefly late in the afternoon, in the dark of the winter months," etc. (67-68.)

"I have mainly consorted with my horse for eight years back." (69.)

He was thrown from his horse and hurt in 1868 (73 years old), and renounced riding thenceforth.

Tremulousness and twitching of the right hand came on in 1870, and made writing impossible.

At the age of 80 he had "bright reminiscences of health."

"He was attended by a Scotch physician. He disliked doctors generally, and through life had allowed none of them near except his brother; but he now submitted to occasional visits." (83.)

He died February 5, 1881, aged 85.

If the theory I have formed of the origin of Carlyle's ill-health is correct, the reasons that the first appearance of symptoms is so late as at the age of 23 may be one or more of three:

1. Symptoms of headache, indigestion, etc., during boyhood may not have been recorded. Very often such symptoms take the form of, or are supposed to be, other diseases.

2. His sound constitution and fine Scotch inheritance from a rugged, resistant, and healthful ancestry enabled him to conquer disease in the critical period of youth, when another would have succumbed. There is also no evidence that he was a hard student as a boy.

3. His "error of refraction" may not have developed until his twenty-second or twenty-third year. During this growing period astigmatism and other optical defects may increase or decrease in a few years or even a few months.¹

¹ I have had one fine boy as a patient whose eyes had to be retested every few months and whose astigmatism steadily increased from a low degree until it became very high as he approached manhood. Whenever his astigmatism had increased one half of a diopter everything eaten would at once be vomited, until his spectacles had been changed. Persistence of neglect resulted in positive emaciation.

Upon entering adult life Fate knocked at Carlyle's door as abruptly, ominously, and clearly as at the beginning of Beethoven's Fifth Symphony. While a student at Edinburgh, and applying himself severely, dyspepsia seized upon him with the train of symptoms so persistently and clearly described by him for almost exactly 40 years. He spoke of the next three years as "the most miserable of his life," but it is plain that from 42 to 56 his sufferings were far more intense. The bitter want of sleep, and complaint of noise, and the heartrending heart-sickness, intermitted only during the life at Craigenputtock, for the four coming decades. That they did stop, and exactly when, the accommodating function was paralyzed by age—this is to me a most significant fact. With most noteworthy wisdom he says at 57: "It is a change of epoch with me, going on for good perhaps. I am growing to perceive that I have become an old man." The full establishment of presbyopia is the beginning of old age with every man.

Carlyle's Constitution.—With characteristic froudery his biographer thus alludes to Carlyle's physical endowment in three different places:

(a) "His actual constitution was a great deal stronger than that of ordinary men."

(b) "His health was essentially robust."

(c) "Robust constitutional strength was not among the gifts which nature had bestowed upon Carlyle."

This is a minor one of the thousand illustrations of the inexplicable blunder Carlyle committed in entrusting his manuscripts and biography to the ineptitude of this caricature "Greek Chorus." How unconquerably tough and sound must have been the natural constitution that, after 40 years of continuous daily excruciating torment, could enjoy 22 years of healthy old age, and die at the ripe age of 85. At 58 Carlyle says: "It is strange how little decay I feel; nothing but my eyesight gone a little." At 60 "the world was well; all was well." Even at 41 he says of himself that "nothing was essentially the matter," and at 42, "my health is not fundamentally hurt."

His physiologic habits were also of the best possible. His food was always of the simplest but it had to be of the best quality, usually sent from the old Scotch home. He was careful, he was compelled to be most careful, in all matters of personal hygiene, as regards exercise, etc., and physical sin was as impossible to him as moral sin. The reader of his life and letters will perhaps wonder if tobacco may have had anything to do with his irritability and bad health. But smoking (in moderation as Carlyle practised it) does not have that physiologic effect, as millions can testify. Carlyle's judgment in this and in many such matters was most accurate. Some Edinburgh physician in the early years of his "dyspepsia" had told him that tobacco was the cause of his digestional difficulty, and by his

advice he gave it up, but "found I might as well have poured my sorrows into the long hairy ear of the first jackass I came upon as of this select medical man."¹ And he rightly continued the habit to the day of his death. One of the earliest, most continuous, and latest grievances was insomnia. "It goes to my heart when he told me in his last letter that he could not sleep without his finger in his ear." All oculists know that insomnia is one of the most common and persistent symptoms of eye-strain.

What I have called the second critical period ended with Carlyle at about the age of 32, and the six years at Craigenputtock were the happiest he was ever to have—for after 60 there were other reasons than physical for unhappiness. Like De Quincey (and like Dar-

¹ That Carlyle's judgment concerning those physicians he met was not far wrong, I quote the following remarkable "clinical observations" from the *British Medical Journal*, November 9, 1895, page 1147.

"The late Mr. Carlyle was a patient of mine. As all the world knows he was a man of great judgment and great power of observation. With regard to himself, the only remedy I could ever get him to take was grey powder. He lived to 82 or 83. Grey powder was his favorite remedy when he had that wretched dyspepsia to which he was subject, and which was fully accounted for by the fact that he was particularly fond of very nasty gingerbread. Many times I have seen him sitting in the chimney corner smoking a clay pipe and eating this gingerbread. He overcame the difficulties incident to this habit by his grey powder, which did him much good." (Sir R. Quain.)

win, Huxley, and Browning also) Carlyle found that the sole and absolute condition of ability to read and write as well as to live, was continuous and prolonged exercise in the open air. When he could afford a riding horse he was better. A large part of his life was spent in riding horseback (he speaks of one of his horses having carried him 20,000 miles), or in walking, often in the night. Besides the quiet, the eye-resting distance, etc., this is another reason why he was so much better at Craigenputtock. "He could do fully twice as much work there as in London." The more he read and wrote the worse his health. Many quotations show that he knew the direct relationship between writing and distress. In the forenoons at his desk he fights with dulness and bile "as of old;" while in the hours of riding in the afternoon he has "almost an immunity from pain." He even reduced the fact to a generalization, finding that literary work caused his suffering;

"If literature will refuse me both bread and a stomach to digest bread"—

"If Providence ever did warn it, warns me to have done with literature which will never yield the bread nor the stomach to digest bread."

"I had made myself bilious enough with my writing."

But thousands of other people all over the world work at literary work many more hours a day than did Carlyle and without "upsetting the stomach," "deranging the liver," or producing irritability and melan-

cholia. There are a few million in the world in whom these are the results of the use of the eyes at near range, but there are many more millions, clerks, sewing-women, craftsmen, artists, etc., who have no such troubles.

His Symptoms.—Throughout the annotations of the unendurable are scattered the insinuations that Carlyle's sufferings were largely the products of his disordered fancy. "His imagined ill-health," he says: "He saw his ailments through the lens of his imagination"; "it was in his nature"; "he could not conceal that he was pretty well and had nothing really to complain of"; "why at the acme of success and fame could he not bear and forget too? Why indeed! The only answer is that Carlyle was Carlyle,"—a hundred such poor sneers could be gathered. But no man not eaten up with incorrigible conceit can read the pathetic record of those forty years of poignant wretchedness and doubt the reality of the suffering. The physician, who has heard the same pitiful recitals of anguish from his patients recognizes the utter sincerity of Carlyle's utterance: "Am getting weary of suffering, feel as if I could sit down in it and say, well then, I shall soon die, at any rate." "I am near heartbroken. Nobody on the whole *believes* my report."

As regards his irritableness, melancholia, and mental misery generally, Froude says in a hundred ways and "insinuendos" it was all in "his nature," that he could

no more escape from these things than his body "could leap off its shadow," etc. But what more beautiful character ever showed itself than in the early essays? The man who, poor and self-denying as he was, secretly gave away to the poor at least half his income, and who honored his father and passionately loved his mother—he a genius, they peasants; the man who wrote and felt to Mrs. Carlyle as he did—such a man was to be honored rather than pitied. As regards religion, so as to literary work, he could neither accept nor reject, and in both he was compelled to follow the advice of Clough—

"Take it not and leave it not
But fight it out, O Man!"

Carlyle himself knew better: "I declare solemnly without exaggeration that I impute nine-tenths of my present wretchedness, and rather more than nine-tenths of all my faults to this infernal disorder in the stomach." "On days when moderately well I feel as happy as others; happier, perhaps," and a thousand lines could be quoted as lovely and as true as, "The world is God's world, and wide and fair." Even poor Mrs. Carlyle, who "married for ambition," could but say, "My husband is as good company as reasonable mortal could desire." That he was at times gloomy, irritable, morose, harsh, etc., no one would deny, least of all Carlyle himself. But that it was his essential nature to be so—every page of the letters gives the lie

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to this faithless indictment. Those things were simply the symptoms of his awful disease.

Carlyle had throughout his life more or less of what American oculists call "theater headaches" or "panorama headaches." A great many of our patients, until eye-strain has been stopped by glasses, cannot attend banquets, concerts, theaters, etc., without disastrous effects to head and "nerves." When Carlyle went much to the Museum he had what he called "mūsæum headaches." When he went to a "party" he returned with "headache and shattered nerves," and vowing never to do such a foolish thing again.

As regards the actual ocular conditions, the refraction, etc., we have in Carlyle's case the indefiniteness we should expect. Illuminating suggestions may exist in letters not printed. The complaint of *muscæ volitantes* spoken of in the Emerson letter (Vol. I., p. 91) has no significance whatever, and his explanation of it (as, "part of the retina protesting against the liver and striking work") is as childish physiology as any savage "medicine-man" could devise. So far as concerns conditions of ocular work we must not forget the increased difficulty in dark, smoky London, and from the use of "farthing rush-lights" and candles. The first complaint of "dimmed sight" is at 40. At 42 "reading proof wasted and fretted him to a thread and made his tongue as dry as charcoal." At 56 the painter of his portrait could not help carrying to the

canvas the pained, exhausted look of eye-strain to be seen in all the later portraits of him, and which tells the oculist with the first glance at many patients the epitome of years of morbid ocular labor. Carlyle said the picture was of "an idiot that had taken Gladber's, sales and lost his eyesight," and he was disgusted in a Carlylean way. At 57 he spoke of "half-blind eyes." At 58 the note about "specs" is so vague, we cannot draw any conclusions from it. It only shows the old, old, popular folly of picking up mother's specs or grandmother's, when irreparable injury has been done and life nearly lived out and suffered away. "Eye-sight gone a little," at 58, tells probably of the amblyopia that finally follows long lack of correction of ametropia, and "eyes very dim even with abundant light," at 59, emphasizes the fact, and also almost demonstrates the existence of astigmatism, which failed accommodation revealed and which no common optician's (spherical) lenses could help. That the ametropia was not due to cataract is certain because he retained useful vision for 26 years afterward. Head-aches with proof-reading at 62 show the return of the reflex neurosis to the head instead of as formerly almost solely to the digestive organs.

His treatment of himself—for he took no physician's advice but once and for a brief time—was chiefly by castor oil, which he felt obliged to take most of his life, and most copiously and constantly the

greater the amount of his "biliousness", and of his correlated eye-strain. At times we hear of salts and of blue pill in addition to the castor. It is evident, I think, that the digestive function was inhibited, and that the bile was deficient instead of the reverse, as his descriptions would imply. It is a poor oculist that has not learned that eye-strain produces constipation. Many thousands of American patients know it well.

Carlyle's opinion of the medical profession was, so far as concerned his own case, entirely justified and justifiable. Had he consulted a hundred of the best general physicians in England he would have got no more help than from the one he sought out in Edinburgh. It was exactly so later with Darwin, Huxley, and Browning. "The stomach," and "the liver," would have been charged with bad function, and travel and rest would have been ordered. Indeed it would be precisely the same story to-day. It is certainly time that the question were asked, Why do the stomach and liver work so poorly? A functional disease is a curable disease if the cause of the malfunction is diligently sought for. The fleeting sensations about the heart twice spoken of by Carlyle are of little consequence. The Badams incident is, to a physician, most amusing, although it was serious enough to Carlyle. One is almost glad that the stomach-curer met a sorry reward in his "intolerable headache" "cured" by drink.

Carlyle also quickly saw through the nonsense of the Gully water-cure. The diagnostician who from the hundreds of references made to his symptoms by Carlyle would seek to gather any definiteness of pathologic finding will fail. Picturesque, passionate, terrible as they are, they are even more indefinite. At first it was more clearly stomachal, if we may trust that his location of this organ was topographically correct. "Like a rat gnawing at the pit of his stomach," are his words. But the complaints of "nervousness," of "coarsed nervous disorders," of "stupidity," "sickness of body and mind," "hypochondria," "sleeplessness," "dullness," "weakness," etc., make one wonder just what organ was the most affected. "Bile," "bilious," and "derangement of the liver" are so commonly repeated that if one could by any possibility learn what lay people mean by such words we might stop to consider the blameworthiness of the poor liver. The pretty nearly certain thing is that to Carlyle and such complainers the "liver" and the "stomach" were mythical scapegoats upon which all vague miseries could be laid and both properly and improperly cursed. The sad thing is that the sorrows were not got rid of by this procedure. In fact it is perhaps true that when Carlyle complained of bile, he should have complained of lack of bile. The drugs he took during most of his life would imply this without the strange and strabismic allusion to the "'pipeclay state' too common with

those who are too well furnished with bile." Indeed the 'digestional reflex of an ocular irritation is essentially inhibitive.

• On the whole it is clear both from the profound reality of suffering and from the impossibility of localizing it in any organ, that there was never any organic disease whatever. "Gastrodynia" there was, if one has any satisfaction in such tautologic and meaningless words, and many other *dynias*, and *dys's*, but not "gastric ulcer" or any other morbid tissue changes or lesions. Such pathologic conditions do not disappear suddenly at 60 years of age, and leave one free for 25 more. The mystery of his affliction had struck the attention of Carlyle (as under similar circumstances it had done with De Quincey), and he said, "What the cause is would puzzle me to explain." Looking at the symptomatology more closely we find that the daily rhythm of the rise depends exactly upon the amount of reading and writing, and of the fall upon the amount of disuse of the eyes. Then there is the enormously heightened intensities clustering about the execution of the more important "works. After each, except at Craigenputtock, there is a terrible revulsion. After the completion of Meister at 29, things were so bad as to warrant the sadly ludicrous Badams incident. Wide and miscellaneous reading brings a great increase of the bitter complaints at the age of 31. At Craigenputtock he produced with little complaint the

essay on Burns, German literature, Characteristics, Diderot, and others, and the incomparable "Sartor." Would that he could have remained there the rest of his life! After "The French Revolution", "he fled to Scotland fairly broken down," and the sufferings of the next years are perhaps the greatest of his life. He produced little for five or six years, and at the height of his success he was most miserable. Even after such a small work as "Past and Present" (48) he required six months' rest and travel and then was incapable of work. "Cromwell" took three years of his life, and was composed with infinite suffering, and then is three years of rest. "Frederick" is begun at 57 and completed at 69. But now appears the new phenomenon, what he calls the "change of epoch." Complaints end, although he is working hard at his great task. There is no working hypothesis except that of eye-strain that will explain all these things. After each day's work, each essay, each volume, each entire work, there was the need of rest, the increase of poignant complaint, the exhaustion of despair, the startling approach to death which up to the beginning of "Frederick" became more and more frightful. After each was the sickness of weariness, the weariness of sickness, the "dulness," the "stupidity," the appalling lack of energy. But Carlyle knew he was not stupid, or dull, and when it seemed that he was most so, he could for hours roll forth such brilliant monologue and conversa-

tion as to make the richest and wisest of the land delight to hear him, and to invite him to their houses in order to hear him. Intellectual activity did not tire or hurt him—it was only intellectual activity plus reading or writing that soon gave atrocious suffering. This is demonstrated by the further fact that, after each work, it took a longer time and a great and greater self-scourging to whip himself into the new labor. He would sit and stare at his book or writing, shut in unconscious stupor, until he had spurred himself into the white heat of passion which was required to enable him to work, and which when it had passed left him a wreck of exhaustion. He says:

“There is a shivering precipitancy in me which makes *emotion* of any kind a thing to be shunned. It is my nerves, my nerves.”

“My work needs all to be done with my nerves in a kind of a blaze, such a state of body and nerves as would soon kill me if not intermitted. I have to rest accordingly, to stop and sink into total collapse, to get out of which is a labor of labors.”

“He wrote ‘with his heart’s blood’ in a state of fevered tension,” says Froude.

“Work is not possible for me except in a red-hot element, which wastes the life out of me.”

All of which is inexplicable except upon the theory that eye-strain was the cause of his trouble. It was not so during the writing of “Frederick” which, begun at the age of 58 or 59, was carried forward leisurely without pain, and without appalling groans and cries of

anguish at the end. Noticeable also is the fact, however, that after its completion and during the last sixteen years of his life there was practically no production of work. The "ablaze" and the "white heat" of his nerves, with which he had been compelled to work to develop the power to counteract the inhibition and irritation of morbid ocular function, had ended in final paralysis of brain and will.

And Carlyle was actually conscious that with his great powers he had been able to do so little work. There are generally no better, and more productive years than those between, say, 42 and 58. Carlyle writes at the age of 58: "Here are now ten years, and what account can I give of them? The work done in them is very small even in comparison." If I take the number of pages of the edition at hand, of his collected works, I find that they foot up about ten thousand. Dividing this number by the number of days of his sixty years of working life I find that he produced at the rate of less than one half a page a day. If we suppose that for every printed page he read ten pages to get his data, we find that the entire reading and writing was thus equal on the average to about five and one half printed octavo pages a day.

In some men the untoward conditions of circumstances, the ill-health, the mental abnormalism, etc., may have little or no effect upon the quality of their literary labors. In others this may be subtly modified,

and in others still the differences caused may be most profound. Carlyle, I think, is an example of the last class. Every work he brought forth is in almost every line modified by the direct result of the conditions of eye-strain while engaged upon it. The very choice of subjects are dictated by it. With the resistance and energy of youth overcoming all disease we have the beautiful objectivity, the combined "sweetness and light", the humor, and the charm of the early essays and of "Sartor". What could be more like his wrecked soul than the "French Revolution", both in subject and treatment? History written by lightning flashes it is indeed, but the lightnings are those of his own mind in thunderstorm that brought in its fury, brief peace, but that also brought destruction. Again how imperative of his mood and how logically responsive was "Chartism", "Heroes", "Cromwell", and "Past and Present"! But, at last at peace, "Frederick" (taking twelve years to write) shows what the character of the lifework might have been if the thirty-eight previous years had not been lived upon the rack of atrocious suffering. The unauthorized pessimism, the pitiable antiscience, the foolish arrogance, the outrageous "Ilias Americana in Nuce," and all such things are excusable. Such trifles may be forgiven him in that he loved much and heroically, but it is to me beyond question that deductive as his mind essentially was, not inductive, prophetic and ethical as was his

inevitable function, he would not have been the subject of such blundering if he had not been stung to it by his tortures. They were the groans and deliriums of a nervous system in awful agony.

When the storms of the life voyage were over Carlyle had a splendid opportunity to gather to a focus all the experience and wisdom he had gained. And splendidly he improved it! Among the noble truths there glowing with softened but exquisite light he urged that the function of universities was to create libraries and teach the student to read. Assiduity in reading is the great study of the intellectual man. There was not a word of course as to the mechanism of reading, and one is grieved to think of this and the fact that the labor of reading with an optically wretched instrument had been the cause of the speaker's life-tragedy. And that it would be the same with thousands of his pupils then and since!

Lastly comes the lesson called "a very humble one," but which not even he could realize how and why it was far from humbly important:

"In the midst of your zeal and ardor, . . . remember the care of health. . . . It would have been a very great thing for me if I had been able to consider that health is a thing to be attended to continually, that you are to regard that as the very highest of all temporal things for you. There is no kind of achievement you could make in the world that is equal to perfect health. What to it are nuggets and millions? The French financier said, 'Why is there no sleep to be sold!'

Sleep was not in the market at any quotation. . . . I find that you could not get any better definition of what 'holy' really is than 'healthy.' Completely healthy; *mens sana in corpore sano*. A man all lucid, and in equilibrium. His intellect a clear mirror geometrically plane, brilliantly sensitive to all objects and impressions made on it and imaging all things in their correct proportions; not twisted up into convex or concave, and distorting everything so that he cannot see the truth of the matter, without endless groping and manipulation: healthy, clear, and free and discerning truly all around him."

He is compelled by the very nature and mathematics of the subject to use the images of physical and physiologic optics. It is as necessary for the eye to be optically right as for the intellect. Moreover, he did not know, as even then he might have known, that the intellect whose function he could best describe in optical terms is psychologically most literally and absolutely the creation of the act of vision. It has the qualities of geometric and imaging perfection only because by the heredity of millions of years the optically correct, or approximately correct, eyes of innumerable ancestors have produced the optically correct intellect. The acme of physical and intellectual suffering is to supply a correct intellect, the product of eyes, with an optically morbid pair of eyes, and compel them to work for sixty years against the demands of the laws of all past time.

Let us make one last quotation from the inaugural address. In the face of the fact that numberless thou-

sands and even millions of hard eye-workers (literary and others) are clear-sighted physically and mentally, and have no considerable suffering therefrom—despite this which Carlyle should have thought of, he says: •

“We can never attain that [the holy and healthy, optically perfect intellect] at all. . . . You cannot, if you are going to do any decisive intellectual operation that will last a long while; if, for instance, you are going to write a book—you cannot manage it (at least I never could) without getting decidedly made ill by it: and really one nevertheless must; if it is your business, you are obliged to follow out what you are at, and to do it, if even at the expense of health. Only remember at all times, to get back as fast as possible out of it into health, and regard that as the real equilibrium and center of things.”

How clearly the virtue and also the vice of the deductionist type of intellect is seen in these words. The subjective experience carried over as a general rule and demand! But how infinitely pathetic! And also how instructive to those who are now seeking to unite the two methods of intellectual activity, deduction, and induction, in one fused flame of philosophic science. The earnest woeful pleading to read books, and to look above all things to the health, by one who had never committed a conscious hygienic sin in his life, and who had looked most carefully after his health every instant almost, of his whole life! And yet, who had suffered as great physical and mental anguish from ill-health as ever mortal did! What every one of his hearers needed and what millions of others still

need to be told is not to care for their health, but *how* to do it. That Carlyle had never once seriously considered; only an enlightened science, an enlightened medical science can teach that. Alas that Carlyle cared for neither! The more imperative is our own duty.

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• CHARLES DARWIN. •

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CHAPTER III.

CHARLES DARWIN.

THE following quotations and epitomizations of the data of Darwin's life are drawn from "The Life and Letters" by his son:

Charles Darwin's father was a highly successful physician, six feet two inches tall, very corpulent, with close powers of observation, and of sympathy. He at first hated his profession, but practised it for sixty years, although he had a horror of operations, or even to see a person bled. This same horror existed in Charles. Modern physicians may to-day read with profit what Charles writes of his father as a physician.

The health of his brother Erasmus was "weak from boyhood and he failed in energy." "His spirits were not high, sometimes low, more specially during early and middle manhood." "He read much, even whilst a boy." "Our tastes were so different."

Charles Darwin was born February 12, 1809.

He was a fleet runner as a boy at school, and loved long walks; his father once said to him: "You care for nothing but shooting, dogs, and rat-catching, and you will be a disgrace to yourself and all your family."

He had great love of poetry and music while young, which entirely disappeared before he was old.

He did "no good" at school, and was taken away to Edinburgh, to study medicine; but he hated it, could not dissect, detested the lectures, and could not endure to see an operation. After two sessions there, as he seemed bound to be "an idle sporting man" his father proposed that he become a

clergyman. This plan finally "died a natural death" in both their minds, and, after spending three "wasted" years at Cambridge, he joined *The Beagle* as naturalist.

The three years at Cambridge, "worse than wasted" in shooting, hunting, riding, and sporting, were the most joyful in his life, because he was in excellent health and high spirits.

When he was compelled to do some reading, it had the result of making him "have spirits for nothing."

"I am so disgusted by reading that I have not the heart to write anybody." (Aged 20.)

"Reading makes me quite desperate." (Aged 21.)

"I do not know why the degree should make one so miserable, both before and afterwards. What makes it more ridiculous is I know not what about." (22.)

The *Beagle* voyage began December 27, 1831, and ended October 2, 1836.

While waiting two months at Plymouth for the departure during bad weather, he was inexpressibly gloomy and miserable, and troubled with pain and palpitation about the heart. (22.)

"We worked together for several years at the same table in the poop cabin of the *Beagle*, he with his microscope, and myself at the charts. He suffered greatly from sea-sickness. After perhaps an hour's work he would say to me, 'Old fellow, I must take the horizontal for it.' A stretch out on one side of the table for some time would enable him to resume his labors for awhile, when he had again to lie down." (Admiral Lord Stokes, *The Times*, April, 1883.)

"He was a dreadful sufferer from sea-sickness, and at times when I have been officer of the watch, and reduced the sails, making the ship more easy and thus relieving him, I have been pronounced by him to be 'a good officer' and he would resume his microscopic observations in the poop cabin." (A. B. Usborne.)

"He was habitually in full vigor. . . . He had, however, one severe illness in South America. . . . I have heard him

say that in this illness, every secretion of the body was affected, and that when he described the symptoms to his father, Dr. Darwin could make no guess as to the nature of the diseases. My father was sometimes inclined to think that the breaking up of his health was to some extent due to this attack." (His son.)

"It has been assumed that his ill-health in later years was due to his having suffered so much from sea-sickness. This he did not himself believe, but rather ascribed his bad health to the hereditary fault which came out as gout in some of the past generations. I am not quite clear as to how much he actually suffered from sea-sickness; my impression is distinct that, according to his own memory, he was not actually ill after the first three weeks, but constantly uncomfortable when the vessel pitched at all heavily. But, judging from his letters, and from the evidence of some of the officers, it would seem that in later years he forgot the extent of the discomfort from which he suffered." (His son.)

"I am quite well again after being in bed for a fortnight." (25.)

"It is lucky for me that the voyage is drawing to a close, for I positively suffer more from sea-sickness now than three years ago." (27.)

From 1836 to 1842 (when he settled at Down because of his ill-health) he lived at London and at Cambridge. The period is marked by "the gradual appearance of that weakness of health," the "bitter mortification" of it, its "permanency," the learning of the narrowness of the limit of his working ability, etc. (27 to 33.)

In 1837 he had an attack of uncomfortable palpitation of the heart. The doctors advised knocking off work and living in the country. Dr. Clark urged "giving up entirely all writing, and even correcting press for some weeks." (28.)

"Work brings on ill-health in 1838, and a three days' holiday trip to Cambridge did him "such wonderful good" and "filled his limbs with such elasticity." (29.)

"I am coming into your way," he writes to Lyell,¹ "of only working about two hours at a spell; I then go out and do my business in the streets, return and set to work again, and thus make two separate days out of one. The new plan works capitally." (*Ibid.*)

"I worked as hard as I possibly could (1839-1842) but had frequently recurring unwellness and one long and serious illness." (30 to 33.)

"I could collect facts bearing upon the origin of species when I could do nothing else from illness." (*Ibid.*)

Ill-health increases in 1839, the holidays become more frequent and longer; at one time a "thirteen months' interval." (30.)

"Read a little, was much unwell, and scandalously idle." (*Ibid.*)

"The entries of ill-health increase in number during these years, the holidays longer and more frequent." (30-33.)

"I have been steadily gaining ground, and really believe now I shall some day be quite strong. I write daily for a couple of hours, and take a little walk or ride every day. I grow very tired in the evenings." (32.)

"Wearisome drives." (33.)

"It was the last time I was ever strong enough to climb mountains, or to take long walks such as are necessary for geological work." (33.)

"I manage only a couple of hours a day (writing) and that not very regularly." (34.)

"I have not had one whole day, or rather night, without my stomach having been greatly disordered during the last three years, and most days great prostration of strength." (36.)

"Many of my friends, I believe, think me a hypochondriac." "Although strong corporeally, he cannot stand mental fatigue, and must have silence after dinner." (36.)

"I therefore write this in case of my sudden death, as my most solemn and last request," etc. (36.)

¹ Then Lyell probably had eye-strain too.

"I have of late been slaving (writing) extra hard, to the great discomfiture of wretched digestive organs." (35 on 36.)

"Short intervals of good health that followed the long illnesses, which often times rendered life a burden to him between 1844 and 1847." (Sir J. Hooker.)

"My little ten-day tour made me feel wonderfully strong at the time, but the good effects did not last." (36.)

"I have been prevented from writing by being unwell, . . . abominable press work." (37.)

"We go to Southampton if my courage and stomach do not fail." (37.)

"Almost continually unwell." "In bed nearly all Friday and Saturday." (38.)

"Very unwell, incapable of doing anything." (38.)

"All this winter I have been bad enough, . . . my nervous system began to be affected, so that my hands trembled, and my head was often swimming. I was not able to do anything one day out of three." (*Ibid.*)

"Health very bad, with much sickness and failure of power. Worked on well days. The water-cure has most extraordinary effect in producing indolence and stagnation of mind. I now increase in weight; have escaped sickness for thirty days." (40.)

"Every one tells me," writes Darwin in 1849, "that I look quite blooming and beautiful, and most think I am shamming, but you have never been one of those." His son adds: "And it must be remembered that at this time he was miserably ill, far worse than in later years." (40.)

He got Dr. Gully's book (on the water-cure) and goes with the entire family to Dr. Gully's establishment. "Dr. Gully feels pretty sure he can do me good, which most certainly the regular doctors could not." (40.)

"It is a sad flaw in my beloved Gully that he believes in everything. When Miss — was very ill, he had a clairvoyant girl to report on internal changes, a mesmerist to put her to sleep—an homeopathist, viz., Dr. —, and himself as hydropathist, and the girl recovered." (41.)

He keeps up the water-cure at home and thinks he is better as the months go on.

"I am allowed to work now two and a half hours daily, and I find it as much as I can do; for the cold water-cure together with three short walks is curiously exhausting, and I am actually forced to go to bed at eight o'clock completely tired. I steadily gain in weight, and am never oppressed by my food. I have lost the involuntary twitching of the muscles, and all the fainting feelings, etc., black spots before my eyes, etc. Dr. Gully thinks he shall quite cure me in six, or nine months more. The greatest bore which I find in the water-cure is the having been compelled to give up all reading, except the newspapers. For my daily two and a half hours at the barnacles is fully as much as I can do of anything which occupies the mind; I am consequently terribly behind in all scientific books." (40.)

"I dread going anywhere on account of my stomach so easily failing under any excitement." "My nights are *always* bad." He takes the water-cure, five or six weeks of treatment every two or three months, "always with good effect." (43.)

He is constantly dreading "hereditary ill-health" for his children. "Even death is better for them." (*Ibid.*)

"The other day I went to London and back, and the fatigue, though so trifling, brought on my bad form of vomiting." (*Ibid.*)

"My stomach has much deadened my former pure enthusiasm for science and knowledge." (45.)

There were several visits to water cure establishments from 1856 to 1858. "I cannot in the least understand how hydropathy can act as it certainly does on me. It dulls one's brain splendidly." (48.)

"As usual, hydropathy has made a man of me for a short time." (49.)

"I have come here for a fortnight's hydropathy, as my stomach has got, from steady work, into a horrid state." (*Ibid.*)

"Nor has my stomach recovered from all our troubles."
(*Ibid.*)

"I pass my time by doing daily a couple of hours of my abstract." (*Ibid.*)

"I am quite knocked up,, and am going next Monday to revive under water-cure." (*Ibid.*)

"So poorly," "health so poor," "health so wretched of late, and has incapacitated me for everything." "I am weary of my work." (50.)

"It is a very odd thing that I have no sensation that I overwork my brain; but facts compel me to conclude that my brain was never formed for much thinking." (*Ibid.*)

"My health has quite failed. I am off to-morrow for a week of hydropathy. I am very sorry to say that I cannot look over any proofs in the week." (*Ibid.*)

"Two chapters in type, and though not yet corrected, I am so wearied out and weak in health that I am resolved not to add one word, but merely to improve the style." (*Ibid.*)

"I have corrected one hundred and thirty pages; I long to finish, for I am nearly worn out." (*Ibid.*)

"I have corrected all but the last two chapters— . . . my health has been very bad, and I am becoming as weak as a child, and incapable of doing anything whatever except my three hours' daily work at proof sheets. . . . Long fit of sickness yesterday. It is so weariful killing the whole afternoon, after 12 o'clock doing nothing whatever." (*Ibid.*)

"I intend, if I can keep to my resolution, of being idle this winter. But I fear ennui will be as bad as a bad stomach." (*Ibid.*)

The complaints were never so bitter and frequent as now during the work of getting the abstract made and proofs through the press of his "Origin." "Before starting here (hydropathic establishment) I was in an awful state of stomach, strength, temper, and spirits." "My confounded book nearly killed me." "I am here hydropathizing and coming to life, after having finished my accursed book." "It is astonishing how idle a three weeks I have passed." (*Ibid.*)

Concerning the general life at Down, his son says that "indoors he sometimes used an oak stick, and this was a sign that he felt giddiness." He rose early, after his always bad nights, walked before breakfast, and the one and a half hours after breakfast was his best working time. He was then read aloud to, and then from 10:30 to about 12 he was able to work some more with his eyes. His day's work was then over.

"With regard to the Sand-walk" (a walk about a one-and-a-half-acre plot of land) "in connection with my father, my earliest recollections coincide with my latest. We continually saw my father as he walked around."

"I think the newspaper was the only non-scientific matter which he read to himself. Everything else, novels, travels, history, was read aloud to him."

"In the evening after he had read as much as his strength would allow, and before the reading aloud began"—

"German was a great labor to him; in reading it he could read very little at a time. He called it the *Verdammt*."

"Anything attempted beyond the regular routine was attended with pain and difficulty."

"He was generally persuaded by my mother to take these short holidays, when it became clear from the frequency of bad days, or from swimming of his head, that he was being overworked."

"He thought the water-cure was a cure for his troubles, but like all other remedies, it had only a transient effect on him."

After the completion of the hard task of putting the "Origin" through the press, he "could hardly sit up" and found that two or three months at Ilkley this time "did him no essential good." The doctor had told him this would be a "unique crisis." "Now, under water-cure, with all nervous power directed to the skin, I can possibly do no head work." (50.)

"I have been poorly with almost continual bad headache

for forty-eight hours, and I was low enough, and thinking what a useless burden I was to myself and others." (51.)

In 1863 began a six months' illness; he remained ill and depressed despite the hopeful opinion of one of the most cheery and skilful physicians of the day. "He (the physician) does not believe my brain or heart are primarily affected." (54.)

In 1864 "his health took a turn for the better" and he was able to do not more than one and a half hours' work on his best days. "My Brain feels far stronger, and I have lost many dreadful sensations." (55.)

In 1865 there was again ill-health, but towards the close of the year he began to recover under the care of the late Dr. Bence-Jones who dieted him severely. (56.)

Even scientific books were now read aloud to him. (*Ibid.*)

It is a horrid evil for me that I can read hardly anything, for "it makes my head almost immediately begin to sing violently." (*Ibid.*)

His health improved in 1866, and he can work one or two hours a day. (57.)

"Science makes him forget for some hours every day his accursed stomach." (59.)

• Health grows better in 1870. (61.)

During the last ten years of his life, the condition of his health was a cause of satisfaction and hope to his family. His condition showed signs of amendment in several particulars. He suffered less distress and discomfort, and was able to work more steadily.

In later years he became a patient of Sir Andrew Clark, under whose care he improved greatly in general health. It is certain that he had no serious and permanent trouble of his heart until shortly before his death.

He died in 1882, aged 73, of heart disease, angina pectoris, atheromatous and senile heart changes.

"For nearly forty years he never knew one day of health of ordinary men, and thus his life was one long struggle of the weariness and strain of sickness." (His son.)

The Influence of Eye-Strain upon Character and Life.—In the article upon De Quincey, I spoke of the psychologic influence of errors of refraction, the powerful and subtle effect of eye-strain in the developing boy upon the character or disposition, the choice of a career, etc. I found reason to believe that this factor had been at work in De Quincey's case, as the unrecognized cause of the seven years' vagabondage of the unequalled scholar. It was the only way the wisdom of the organism could devise to rid itself of the profound injury which reading and writing was causing the nervous and digestive systems. It even made the evil of the opium habit preferable to the unbroken impact of the ocular irritation. To such a mind as that of De Quincey, the literary career could not be escaped, and so there was the life-long tragedy we have witnessed.

In Carlyle's case the dour Scotch inheritance, body and mind, together with physical work, country life, and an absence of an enslaving literary ambition, made him miss the evil effects of eye-strain during youth; but from the age of 23 onward the conditions (reading and writing) of the chosen career made him a great sufferer so long as there was any ocular "accommodation" left. As Mrs. Carlyle said there would have been no "tongues" if Irving had married her, so there would have been no vagabondage and no opium in De Quincey's case if he had chosen the career of a farmer;

and if Carlyle had chosen his father's occupation there would have been an utter absence of the misery of his life and the peculiar qualities of "history by lightning-flashes."

When we come to Darwin, we find the same causes producing the same results, but with the differences of detail which all biologic, and especially all psychologic, phenomena exhibit. For, be he oculist, general physician or intelligent layman, when one reads the life and letters of Darwin, he must be struck with the astonishing fact of the strangeness and illogicality of the life of the great scientist's youth. Up to the age of 22 he had done nothing but waste, "worse than waste," time and opportunity in hunting, walking, riding, athletics, rat-catching, with dogs, etc., so that even his most kind and indulgent father said he would be a disgrace to himself and to his family. Medicine could not attract the attention of the "idle sporting man" and also the function of clergyman had no charm. Why? Because he was in excellent health and high spirits when he did not use his eyes at near range, but any reading made him "have spirits for nothing," made him "so disgusted that he had not the heart to write anybody",—made him "quite desperate." The degree at Cambridge caused him to become "so miserable, both before and afterward," and, "what makes it more ridiculous, I know not what about." Once at the age of 22, he was for two months compelled by bad

weather to keep indoors in a strange place, without friends, and without amusements other than reading, and he was "inexpressibly gloomy and miserable," and 'even troubled with pain and palpitation about the heart.¹ The simple recital of facts compels one to recognize that the wasted years of Darwin's youth were not "worse than wasted" by choice; it was not because of the compulsion of inherent mental tendencies, nor of fashion, nor because of his dislike of classic studies. There was nothing in his ancestry nor in his life-work of after years that would force him to such amusements and to the escape of all study; there were plenty of earnest men at Cambridge, there was opportunity for congenial study—if study of any kind had been possible, and health retained. There was no way to a serious and honorable life, was the unconscious command of the wisdom of the organism, except perhaps through some such a plan as the *Beagle* voyage. Thus science gained its martyr, although he did not know, and indeed he never knew, the exact nature of the cause of his martyrdom.

As to Darwin's Sea-Sickness.—A careful reading of notes I have collated as to Darwin's sea-sickness are quizzically puzzling. From his study of the case his

¹ Similar symptoms were also complained of by Carlyle and Huxley. It was purely functional. Extreme eye-strain will sometimes cause such signs of cardiac irritation, as has been noted by oculists.

son concludes in a state of inconclusion as to the severity, continuance, and even actuality of the suffering from sea-sickness, especially after the first three weeks. This strikes one as very strange. According to the testimony of the rest of us, genuine sea-sickness is not unrecognized and never forgotten by one who has endured it. This haziness of Darwin's own mind and memory upon the subject is illuminating, particularly if we remember that he says in 1836 towards the end of the voyage, that he "positively suffers more from sea-sickness than he did three years ago" and that he is therefore glad it is about over. Even here there is an amusing inexactness. As the voyage began two years more than "three years ago" when he had the "actual" illness of three weeks. It is highly probable that the greater "sea-sickness" towards the end of the voyage was due to the fact that he was far more occupied with his journals and records, writing more in order to put his experiences in literary order, making up for lost time, etc., prior to disembarking. One finds a clue through this odd sort of fog or haze, and begins to understand these peculiar contradictions, when he notes Admiral Lord Stokes' description of the actual facts. When working with his microscope, Darwin was not putting his eyes to the strain they would suffer when reading or writing, and yet, at this early age, and with this slight strain, even an hour's work compelled him to "take the horizontal for it," and a "stretch out

upon the table for some time would enable him to resume his labors for awhile, when he had to lie down again." One smiles cynically at an old sailor like Stokes, who calls that "suffering greatly from sea-sickness." I never yet saw one downright ill with that malign *mal* who could get relief by lying down on a table for a little while, and, thus, repeatedly, be enabled to resume intellectual labor. Plainly, Darwin's sea-sickness on the *Beagle* voyage was the same nausea and morbid nervous symptoms that thousands of patients have described to their oculists, as following use of the eyes without the proper spectacles, and disappearing at once, the moment all use of the eyes is stopped. Darwin had found great discomfort during his youth and up to 22, upon the use of his eyes; it was more pronounced and intense now, during the voyage (some slight sea-sickness cooperating); and, in the productive years of his after life, from the ages of about 40 to about 60, it was a daily tragedy and horror.

Is it not at once clear from all the symptoms and the accounts given that it was not true sea-sickness that was the chief trouble experienced by Darwin during the voyage; that during the time Darwin himself and others said that it was this affection; that in after years, Darwin was in great doubt about it; and that his reports made more problematic the nature of the malady? Moreover, he had little of this problematic affection, according to some of his statements, after the first three

weeks. It was of course natural that the vomiting he had aboard ship should be called sea-sickness, but he had it for thirty years afterward, and the cause of it was probably the same both on ship and shore. It is also as natural that there should afterward be much confusion and indecision in Darwin's mind as to the very existence of true sea-sickness, when he found precisely the same symptoms continuing throughout the greater part of his life. If his vomiting was due to eye-strain, all the haze and discrepancy disappear and the matter stands clear. Why, it may be asked, did he not have the symptom more constantly when on board the *Beagle*? Because, if the expression is allowable, he was younger than when he was ten or twenty years older; i. e., he was more resistant, and he reacted more quickly; but the chief reason is that comparatively he did little or no reading and writing there. It is true, as his son says, that "the amount of work that he got through on the *Beagle* shows that he was habitually in full vigor," but his time was occupied almost entirely with geologizing, botanizing, collecting specimens, and long trips and stays ashore, and with the microscope, and probably with "the horizontal" and idling when sailing. There was no pressing duty of writing or reading, and indeed little occasion for either, so that whenever he felt ill during the little desultory reading he did, he could at once drop it and "take the horizontal for it" or lounge about deck. It was different

in after life, although at best, and whatever the incentive, he could never do but two or three hours' work a day.

There is a striking confirmation of the view I have intimated, and one that shows Darwin to have been singularly resistant to genuine and uncomplicated seasickness. In 1838, between one and two years after the end of the *Beagle* voyage, Darwin went to Scotland (on a holiday for bad health) by steampacket to Edinburgh. Upon his return he wrote to Lyell:

"My trip in the steampacket was absolutely pleasant, and I enjoyed the spectacle, wretch that I am, of two ladies and some small children quite sea-sick, I being well. Moreover, on my return from Glasgow to Liverpool, I triumphed in a similar manner over some full-grown men."

He was geologizing and not reading, writing, or even using the microscope. It seems evident, therefore, that at best the *Beagle* "sea-sickness" except perhaps during the first three weeks, was not due to the ship's motion, but rather to the same cause that produced the nausea, etc., in after years.

The Severe Illness in South America.—Although "habitually in full vigor" during the *Beagle* voyage (with the exception of the reflex neuroses due to the use of the eyes with the microscope, etc.), Darwin had one "severe illness" of so strange a type that "every secretion of the body was affected." When the symptoms were described to Darwin's father, he "could

make no guess as to the real nature of the disease." If we knew accurately, instead of knowing nothing of the actual life of Darwin during the weeks or even days, before the seizure, we should, I doubt not, find that during some time of forced bodily inactivity severe use of the eyes had precipitated the attack. If we could have far more accurate description of all the symptoms we could understand better just what took place, what organs bore the brunt of the derouted reflex, what was the morbid result, or what disease this protean ocular "insult" led up to or assumed. Nothing better proves the almost uncanny inerrancy of the diagnostic acumen of Darwin's father than his indexing perception of the possible unity and connection of this special attack with the bad health of the later years. The adumbration of the truth, the mixture of the truth and error, in the passing remark, is of especial suggestiveness.

The First Two Years at Home, after the Beagle Voyage.—Darwin arrived at home October 5, 1836, in most excellent health and spirits. He was very soon busy getting his specimens and collections off the *Beagle*, properly disposed of, unpacked, etc. At this time he wrote to Captain Fitz-Roy:

"However others may look to the *Beagle's* voyage, now that the small disagreeable parts are well nigh forgotten (italics mine), I think it far the most fortunate circumstance in my life (italics are the author's) that the chance afforded by your offer of taking a naturalist fell on me."

On November 6, he wrote:

"My London visit has been quite idle so far as natural history goes, but has been passed in exciting dissipation among the dons of science. All my affairs, indeed, are most prosperous."

In March, 1837, he wrote.

"The only evil found in Cambridge was its being too pleasant; there was some agreeable party or other every evening, and one can not say one is engaged there with so much impunity as in this great city."

The last allusion is the first ominous sign we find of what he later called "London for smoke, ill-health, and hard work." But in October, one year after the end of the *Beagle* voyage, we have these words: "

"I have not been very well of late, with an uncomfortable palpitation of the heart. . . . When I consulted Dr. Clark in town he at first urged me to give up entirely all writing and even correcting press for some weeks."

He was busily engaged in literary work on the results of his voyage, which he continued despite Dr. Clark's advice. But in May, 1838, he was compelled by his symptoms to stop work for a holiday at Cambridge. This he thoroughly enjoyed, and it did him "such wonderful good and filled my limbs with such elasticity that I must get a little work out of my body before another holiday."

But in June he was worse and had to give up work and take the geologizing trip in Scotland wherein, as

we have seen, he was still able to triumph over others as regards sea-sickness.

Thus ends what may be called the period of youth and health of Darwin's life. He had escaped all the disastrous effects of eye-strain in boyhood by not studying at all, by the "waste and worse than waste" of his time, as his father said, in sports. It was a wise waste, as we now know. The same unconscious wisdom drove him along "the line of least resistance" in the study of natural history and in seeking the appointment of naturalist in the *Beagle* expedition, during which there had been comparatively little use of the eyes in reading and writing, and much out-of-door activity of all kinds. By disuse of the eyes in reading and writing he therefore certainly escaped the "first critical period" of eye-strain in boyhood. The "second critical period" he also came near missing in the same way, but it was represented by his *Beagle* sea-sickness, and perhaps the strange illness in South America. Certain it is that he returned in 1836 in perfect health and spirits, full of hope and ambition, and when the short period of "dissipation" was over, the effects of his plunge into work were at first resisted with remarkable strength. The first slight intimation of ill-health was in six months, but in one year it was so sharp that Clark advised stopping all writing, proof-reading, etc. In two years after his return, the enforced holidays did little or no permanent good, al-

though while taking place there was immediate relief; the resiliency had not yet been entirely lost. Henceforth, however, the escape from reading and writing was impossible (ah, that he had tried dictation to an amanuensis!) and as the duty grew more unavoidable there was also at last, the growing handicap of presbyopia.

From the Age of Twenty-Nine, to the End of Accommodation Failure.—It is strange that Darwin himself and his physicians should have supposed that intellectual labor was the cause of his symptoms. It is true that Dr. Clark was accustomed to tell his literary patients to quit proof-reading, writing, etc., and take a holiday, but this was routine, and with the plain intent to break up mental work, and of course, infinitely far from any consciousness that it was abnormal ocular function, instead of intellectual over-exertion that was at fault. Once Darwin recognized this when at the age of 50 he wrote: "It is a very odd thing that I have no sensation that I overwork my brain." This was when he was hardest at work on the "Origin." As if thought and laborious intellectual action could be stopped in De Quincey, Carlyle, Huxley, or Darwin by making them walk half their lives or more about rings, sand-walks, or moors, or ride 20,000 miles on one horse, etc.! In reality such things made mental action the greater, adding also worry, introspection, the regret of lost time, etc. Indeed, Darwin says that

when he could do nothing else from illness, he could collect his facts for the "Origin of Species." Correcting proofs is by no means such intellectual work as thinking out and composing the "Origin of Species," and yet Darwin himself wrote, "and, also, there yet remains the worst part of all, correcting the press." It was worse because it was more laborious to the eyes. Doubtless the splendid inductive quality of his mind, the patient and tireless gathering of facts which distinguishes his books and bottoms them upon an incontrovertible basis, was in great part due to this, that he was unconsciously compelled to spend his time so largely in some manner as did not induce the reflexes of eye-strain. In this connection it is noteworthy that he so early adopted the suggestion of Lyell of dividing the working day into two parts, working about two hours at a spell, and resting between. But nothing could prevent the frequently recurring "unwellnesses," the long and serious illnesses, the longer and more frequent holidays, one thirteen months long at the age of 33, when he congratulates himself that he can work two hours a day, etc.

There is one noteworthy difference between Darwin and all the others we are studying in this series. At the age of 33 he regrets that he must renounce long walks, mountain-climbing, etc., whereas the others never lose this kind of physical vigor. I think this difference is explainable as due, for the most part, to

the vomiting from which he suffered.¹ This with insomnia was his most constant symptom; the resulting denutrition was great, and left him with little nerve-force for muscular innervation. What little was left was further reduced by his morbid addiction to hydropathy, which, while it "dulled his brain splendidly" and rested his eyes a little, still, did more harm, I think, than good.

At 36 he had not a day or rather a night for three years without great stomach disorder, most days with great prostration of strength. He became so alarmed that he believed he should die, and made "a solemn and last request." Trembling of the hands and "swimming" of the head were added to the other symptoms in 1838, whilst severe headaches were added to at the age of 51. If it was possible for a worse than usual to exist from the age of 30 to that of about 57, it was when he was putting the "Origin" through the press at the age of 50. At the completion of that hurried work, he was in a deplorable condition. I need not repeat or recapitulate the evidences of his physical condition I have partly gathered in the preceding selections. There are a number of indications of the close connection of ocular labor and the immediate appearance or recrudescence of systemic

¹ He dreaded at 43 to go anywhere, fearing that his stomach would so easily fail; excitement or fatigue would cause the "bad form of vomiting."

symptoms, the exhaustion, etc. Reading at 20 and 21, we remember, made him have "spirits for nothing," "disgusted him so he had not the heart to write anybody," made him "miserable before and after," etc. Such allusions constantly recur, *e. g.*, at 30 he "read a little, was much unwell"; at 36, "slaving (writing) extra hard brought great discomfiture of wretched digestive organs"; at 37 "abominable press work" prevented him from writing, being unwell; at 45, his "stomach deadens his former pure enthusiasm for science and knowledge"; at 49 his stomach "got into a horrid state from overwork"; at 50, "health failed, cannot look over any proofs"; he is "wearied out," "worn out," "weak as a child," etc., with proof-reading. At the completion of the "Origin" he was in an awful state of stomach, strength, temper, and spirits; "my confounded book half-killed me."

There are several facts that should be borne in mind as to all the terrible years at Down and at the hydropathic establishments:

1. He had to give up all extra reading and writing except the newspapers whilst he was at the water-cure establishment, as two and one half hours at his regular work was all that was allowed, and with the exhausting, brain-dulling water-cure he was completely tired and had to go to bed at eight o'clock, etc.

2. The compelled and tiresome idleness, as he was able to work but one and a half to three hours a day.

"It is so weariful killing the whole afternoon after 12 o'clock doing nothing whatever. . . . I intend if I can to keep my resolution, of being idle this winter. But, I fear ennui will be as bad as a bad stomach."

3. The necessity of exercise and its peculiar kind—the daily round upon round of the "sand-walk," year in, year out. "In connection with my father, my earliest recollections coincide with my latest. We continually saw my father as he walked around."

4. "I think the newspaper was the only non-scientific matter," says his son, "which he read to himself. Everything else, novels, travel, history, was read aloud to him."

5. The great labor German was to him. He could read but very little of these "verdammte" eye-wearying forms of letters.

Each one of these facts adds to the cumulative evidence that eye-strain was the fundamental cause of Darwin's ill-health.

The influence of completed presbyopia and the remarkable cessation of almost all of the troublesome symptoms that had made such a tragedy of his life, is a further proof, if needed, of the theory. In 1866, when he was 57, his health improved so that he could work one or two hours a day; at the age of 59, "science makes him forget for some hours his accursed stomach." From this time on the complaints cease almost entirely; in these last years of his life "the

condition of his health was the cause of satisfaction and hope in his family; . . . he was able to work more steadily."

It was plain that there was no organic disease, and that most strangely there was a sudden and apparently causeless cessation of the cause of the afflictions of the past thirty years. I do not judge that this return of health was due to the care of—any physician. The loss of accommodation ended the life-long struggle of the ciliary muscle to overcome the compound hyperopic astigmatism of his eyes, the existence of which will alone explain the mystery of Darwin's ill-health. His symptoms, vomiting and other functional digestional disorders, insomnia, vertigo, headache, apathy, and neurasthenia, are precisely those which the best American oculists find are the most common symptoms of this refractive anomaly of the eyes. Every fact concerning his health and, indeed, almost every day's experience during his life demonstrated that use of his eyes at near range produced these symptoms.

The Literary Product.—Up to the time when Darwin's health began to improve, *i. e.*, about 1866, when he was 57 years of age, he had written five major works, the "Naturalist's Voyage," "Coral Reefs," "Origin of Species," "Fertilization of Orchids," and "Movement in Plants," aggregating, in the edition I have, about 2,400 pages, or an average of writing of about eight lines a day. Against the five books in thirty

years we have eight books (omitting the "Life and Letters"), published in the fifteen years from 1867 to 1882, and aggregating about 3,700 pages, or an average more than three times as great as in the former period. As with Carlyle, the total product averaged less than one half-page a day. I cite such figures only as indicative of the difficulties under which both men worked, and not as a suggestion that one page of their writing is not of a thousand times the value of those of more fluent writers.

Postscript.—The foregoing pages were written exactly as they stand when I turned to the article (which I had kept unread until I should have made my own study) written by Dr. W. W. Johnston, of Washington, D. C., upon "The Ill-Health of Darwin," and appearing in the *American Anthropologist*, Vol. 3, No. 1, January-March, 1901. Dr. Johnston emphasizes the following points:

1. The indefiniteness and paucity of statements as to the health during the voyage, and Darwin's great powers of physical endurance.

2. He was only "occasionally unwell" for two years and three months after his return.

3. "Frequently recurring illness" and "losing ground year by year" for the next three years until the removal to Down.

4. The symptoms and habits of life as described.

5. "For increasing suffering there was but one remedy—a complete abandonment of all writing and absence from home and study" . . . "Overwork or a long-continuance of moderate work made him ill; rest from work made him better."

6. The marked change for the better is placed at 63; the relief for the rest of his life.

7. "The discomforts, fatigues, and mental overstrain of the *Beagle* voyage can fairly be set down as the initial cause of Darwin's subsequent invalidism. . . . When he landed in England his nervous system was exhausted. . . . On arriving in London . . . he at once began to work as hard as he possibly could, although interrupted by frequently recurring illnesses, and one long and serious illness. . . . Persistent overstrain. . . . The necessary result of all this was to multiply many times the original acquired exhaustion, and to create a condition which was permanent."

8. "He lived a modified form of rest-treatment just such as is now advised for cases like his."

9. "The alternation of work and complete rest was essential for his studies."

10. "Darwin's disease was chronic neurasthenia of a severe grade due first to the overstrain of the *Beagle* voyage, and second to the life of hard intellectual work."

I regret to differ from so eminent an authority and excellent physician as Dr. Johnston, as to the etiology and diagnosis in this case. Far more do I dislike to notice that there is not a particle of evidence for the supposition that there were any "discomforts, fatigues, and mental over-strain" during the *Beagle* voyage which undermined or impaired Darwin's health, and, as we have seen, thinking not of the "small disagreeable parts" of the voyage, but that it was the most fortunate thing of his life. When he landed in England his "nervous system" was not only not "exhausted" but was in an exceptionally sound and active condition. He had no illness at all for the next

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year, and as his son says, failing health after that came on only "gradually." There was no "persistent overstrain" of "hard intellectual life"; there was indeed but a small part of what thousands of others carry on without a symptom. There seems to be a childish popular error, shared even by those who should be accurate, that the solving of intellectual problems such as those which busied Darwin's mind is more wearing and disastrous to the health and mind than the mental exertion of the simplest intellects in the strenuous life which millions have to carry on. The fact is that almost all great thinkers have lived to a ripe old age. As to the "rest-treatment" it frequently happens that the rest-cure does not cure unless reading and writing are interdicted, or proper glasses ordered, and that many neurasthenics are cured by glasses without the rest-cure. In other words, "neurasthenia" may be caused by eye-strain. The ill-defined symptoms grouped under the indefinite word are those most commonly enumerated by patients to the oculist, and their relief by correction of the optical errors is the rule. Calling the symptoms *neurasthenia* does not explain their origin, and to cure them scientifically and permanently it is necessary to prevent the causes upon which they depend.

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THOMAS HUXLEY.

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CHAPTER IV.

THOMAS HUXLEY.

THE following excerpts and facts concerning the life of Thomas H. Huxley are from the "Life and Letters" by his son.

He was born May 4, 1825.

As a boy he "read everything he could lay hands on in his father's library." "Not satisfied with the ordinary length of the day, he used, when a boy of 12, to light his candle before dawn, pin a blanket around his shoulders, and sit up in bed to read Hutton's 'Geology.'" (His son.)

"While very young I commenced the study of medicine under a medical brother-in-law." (Huxley of himself.)

"I am now occasionally horrified to think how little I ever knew or cared about medicine as the art of healing." (*Ibid.*)

"I was a mere boy—I think between 13 and 14 years of age—when I was taken by some student-friends of mine to the first post-mortem examination I ever attended. All my life I have been most unfortunately sensitive to the disagreeables which attend anatomical pursuits, but on this occasion my curiosity overpowered all other feelings, and I spent two or three hours in gratifying it. I did not cut myself, and none of the ordinary symptoms of dissection-poison supervened, but poisoned I was somehow, and I remember sinking into a strange state of apathy. . . . I soon recovered, but for years I suffered from occasional paroxysms of internal pain, and from that time my constant friend, hypochondriacal dyspepsia, commenced his half-century of co-tenancy of my fleshy tabernacle." (*Ibid.*)

About the age of 21, in studying for an examination he "worked really hard from 8 or 9 in the morning until 12 at night." "A great part of the time I worked till sunrise. The result was a sort of ophthalmia which kept me from reading a night for months afterwards." (*Ibid.*)

He received the degree of M.B., in 1845, and entered the Navy as Assistant Surgeon in 1846. The cruise of *The Rattlesnake* ended November 9, 1850. He at once plunged into work, and in 1852 is described as looking "thin and ill." (27 years of age.)

The hopelessness of obtaining a living by pure science came near making him take up some other occupation. "I will not attempt my own profession," chronicles his renunciation of medicine. (27.)

His son says that in 1853 to go abroad from home or to do any work (reading) before breakfast ensured him a headache for the rest of the day, so that he was never one of those risers with the dawn who do half a day's work before the rest of the world is astir. He had a bad bout of ill-health at the end of the year, when he "reformed," rising at 8, and going to bed at 12. (28.)

In a letter from Tenby, South Wales, he says: "I have been here since the middle of August . . . banishing dyspepsia, hypochondria and all such other town afflictions." (29.)

"With you I envy . . . his gastric energies. I feel I have done for myself in that line, and am in for a life-long dyspepsia. I have not now nervous energy enough for stomach and brain both—and if I work the latter, not even the fresh breezes of this place (Tenby) will keep the former in order. (29.)

"I wish I could ascertain the exact *juste milieu* of work which will suit, not my head or will, these can't have too much; but my absurd stomach." (31.)

Open-air occupation and tramping from ten to sixteen miles a day gave him immediate relief. "You can't think how well I am so long as I walk eight or ten miles a day, and don't work too much." (31.)

Longer walking tours, in England, and in Switzerland during the summer holidays now become the necessity and the rule to recruit from "overwork." (31.)

In 1857-1858 his health was greatly tried. Headache! headache! is his repeated note. There are many entries such as the following: "Used up," "hypochondriacal and bedevilled," "not good for much," "toothache, incapable all day," "voiceless," "missed lecture," "unable to go out." (32-33.)

In 1862 he was compelled to go to bed for ten days by an unaccountable prostration of strength which he thinks was due to "obstruction of the liver." (37.)

"I had a pain about my eyes a few months ago, but I found spectacles made this rather worse, and left them off again. However, I do catch myself holding a newspaper further off than I used to do." (39.)

At the age of 47 his son says that "dyspepsia, the most distressing of maladies, had laid firm hold upon him." Even rests and holidays did no good at this time. He confessed that "in the long struggle against ill-health he had been beaten." "Beyond general weariness, incapacity and disgust with things in general, I do not know precisely what is the matter with me." (47.)

"My incessant dyspeptic nausea." (47.)

He was now (1872) forced to take a long vacation, and from Egypt he writes that a month of utter and absolute laziness had completely set him up and he was "well as ever." (47.)

He returned home sunburnt and bearded almost beyond recognition; but "as soon as he began to work again in London, his old enemy dyspepsia returned." Special diet and another trip abroad were ordered by Dr. Andrew Clark, and this effected a "cure." (47.)

But in two weeks after this "cure" he was "just keeping the devil of dyspepsia at arm's length." In two months more he was forced to give up again for two months and go away for a rest.

"It isn't my brains that get wrong but only my confounded stomach." "As my doctor told me, I was sound mind and limb, and had merely worn myself out." (47.)

"I have been worried to death with dyspepsia, and the hypochondriacal bedevilments that follow its train."

The fact is repeated in another letter. (47.)

In January, 1873, he was "getting better from a fresh breakdown of dyspepsia," but he was forced to exist on the "strictest ascetic principles."

He had been seriously ill with severe mental depression. He now took a long summer vacation, walking, geologizing, etc., and "gradually discarding doctor's orders." In a few days he was better, and in two months, "wonderfully" so, "another man," etc. He now thinks "the enemy is beaten," tracing it all to cutting down food, etc. (48.)

In 1875 his health was maintained on a satisfactory level, "thanks to the regimen," etc. (50.)

But in 1876, he is "in rather a hypochondriacal state of mind"; "I will see if this course of medicine will drive the seven devils out." (51.)

There is less complaint from this time to 1884, when "the burden of ill-health grew slowly and steadily. Dyspepsia and the hypochondriacal depression again attacked him as they had attacked him twelve years ago." "His energy was sapped." Nothing could bring him to work. We note that in the worst condition ("spoon-meat" and "inanity") a ten-mile walk was possible and helpful. (59.)

He eats, drinks, and sleeps "like a top." (59.)

"We are fearfully and wonderfully made, especially in the stomach—which is altogether past finding out." (59.)

"I find myself distinctly aged, tired out, body and soul, afraid of work. Physically I have nothing much to complain of except weariness." "There is not the slightest sign of organic disease anywhere." (59.)

"I am convinced that the prophet Jeremiah must have been a flatulent dyspeptic—there is so much agreement between his views and mine." (59.)

Sir Andrew Clark now finds "nothing wrong except a slight affection of the liver and general nervous depression. He orders him to go South and do nothing but amuse himself for three or four months." (59.)

He again complains of "weariness and deadness hanging over him, accompanied by a curious nervous irritability." (59.)

He goes to Italy, but writes from Rome in January, 1885, that he is no "forarder." He is well for a few days and then all adrift, and "have to put myself right by dosing with Clark's pills, which are really invaluable." The pills were strychnin, but by February "Clark's strychnia did not answer so well," and he began taking quinin. By March there was some improvement. In April he returned home, and Clark could only tell him he had a "bad color." (60.)

Lassitude and depression seized him and Clark ordered him to quit all work. He resigns his government positions. By May he was "in a disgusting state of blue devils," although there was really nothing the matter, and a month later he was worse—"blue devils and funk, funk and blue devils. Liver I expect." (60.)

In 1886 he had been "going steadily down," and he called in a physician who told him that "more physicking was no good," and told him to be off to the moors to see what exercise and fresh air, etc., could do. Ten to sixteen miles a day at once brings him up again, banishes the blue devils, etc. "I wish I know what is the matter with me." (61.)

"I do a minimum of ten miles per diem without fatigue and as I eat, drink and sleep well there ought to be nothing the matter with me. Why under these circumstances I should never feel honestly cheerful or know any other desire than that of running away and hiding myself, I don't know. No explanation is to be found even in Foster's 'Physiology'! The only thing my demon can't stand is sharp walking, and I will give him a dose of that remedy when once I get into trim." A single day at Ilkley improves him so that he says he feels like an impostor for running away and "I can hardly

believe that I felt so ill and miserable twenty-four hours ago." (61.)

In 1886, in June, from the country he writes that he has for five months found that a few days in London knocks him up, and he must go back to the moors. (61.)

He goes abroad again, getting better at once, as usual, but in London he came down again, and went to Yorkshire in December to be "pended." (61.)

The first half of 1887 "was chequered by constant returns of ill-health." In June he is sent to bed, "a touch of pleurisy with muscular rheumatism," and he is ordered off to Switzerland, and at once was well again. There was more pleurisy in 1888. (62.)

"As long as I have nothing to do I have nothing to complain of"—but he gets worse steadily. He was on his back and taking iron and digitalis in June, as it turned out "his heart was out of order." He was very ill when he again arrived at Maloja, not being able to walk 100 yards, but in two months he could again walk ten miles and climb 2,000 feet without difficulty.

His heart gets bad when he is kept indoors, however. On his return to England he is again bad, but goes to Eastbourne and the downs and the daily walk again made the bad symptoms disappear. In December his physician (Hames) tells him there are left only slight indications of heart trouble. (63.)

There was returning vigor in 1889; he was out of doors all the time; Sir Henry Thompson scoffed at the idea of his ever having had a dilated heart. (64.)

There was little complaint now. "Broken health was restored" and with out-of-door life, until 1895 when influenza and bronchitis supervened some "renal trouble," and death followed on June 29, at the age of 70.

As a medical case we have, therefore, a man who from childhood applied himself to study with tremendous energy and persistence. Beyond all doubt

he never had any organic disease; the supposed dilation of the heart was even laughed at by Sir Henry Thompson a few years before his death. And yet from the age of fourteen he was a great sufferer. A man of Huxley's nature does not complain except upon the most adequate and real warrant. His suffering for fifty years wrung from him the most bitter complaints, and forced him for the latter part of his life to renounce what he held dear in the world, and to renounce it more and more absolutely with every added year of life. The result of all his study of his own case, the result of all his consultation of physicians, was that neither he nor the physicians had the least idea what ailed him. He was constantly puzzled by the inexplicable mystery. As Carlyle had said of himself, he "might as well have poured his sorrows into the long hairy ear of the first jackass he came upon, as of this select medical man." The result of all treatment except of one kind was nil. Even up to his last years walking in the open air and renunciation of study, reading, and writing, never failed to give him immediate relief, again made him "as well as he ever was in his life," so that after such walks he ate, drank, and slept, "like a top." It shows how truly Huxley diagnosed his own unfitness for the work of a practical physician, when we reflect that his wretchedness of fifty years never made him catch any hint of the fact that whenever he began study, reading, or writing

he suffered, and whenever he stopped these things he was at once well. During his whole life he was teaching and urging upon others the study of physiology. But he never suspected the significance of the physiology of the eye and of astigmatism, and of their relation to his bad health. What was his disease? It was functional, surely, and it was so terribly real that one can hardly imagine what tragedy it brought to him; great as were the study, work, and scientific results of his life, it prevented him from making far more of that life than we can know. The mellowing effect of years, experience, and love of his fellow men were indeed but just beginning to show the splendid possibilities of the future, when, "Resign, renounce, stop work!" became the absolute commands of the doctors, and of fate.

At the age of fourteen he had been reading for a number of years with all that fiery energy and recklessness so characteristic of him. At this time he was present at the dissection table "for two or three hours." One smiles as one reads the naive words, "I did not cut myself, and none of the ordinary symptoms of dissection poison supervened, but poisoned I was, somehow, etc." He had indeed a strange sort of toxemia, but its origin was surely not the post-mortem table. "Apathy" and his fifty years of "hypochondriacal dyspepsia" now began.

At about the age of twenty-one, excessive ocular

labor brought on "a sort of ophthalmia" which prevented him from reading at night for months. During the four years of the cruise of the *Rattlesnake* there was no complaint of ill-health, as in Darwin's case also there was no eye-strain or not enough to cause it. On his return to work on shore at the age of twenty-six he was soon thin and ill, and at the age of twenty-seven he could not read before breakfast without resultant headaches for the rest of the day, so that, after an illness, he "reformed" his habits and went to bed at midnight, and arose at 8. Nothing now checks the reign of the mysterious dyspepsia, liver affection—stomach-trouble, nausea, flatulent dyspepsia, headache, hypochondria—nothing, except quitting study. At the age of about forty-nine he got some respite and for about ten years there was far less complaint. But from the age of 59 to 64 his old troubles and some new ones brought him much grief. With the establishment of complete presbyopia at 63 or 64 there was no further complaint.

•It is certain that our patient had far-sighted astigmatism at least of one or two diopters (compound hyperopic astigmatism), probably with a difference in the refractive error of the two eyes (anisometropia); perhaps he had also some lack of balance of the external ocular muscles (heterophoria) and almost certainly he had good or normal acuteness of vision of the two eyes. He probably never consulted an oph-

thalmologist. How, then, may all of this be more than guessed? By his own "Method of Zadig." It is a pity that this method had not been applied to himself; that his physiology was not practical, or morbid, or clinical.

He had far-sighted astigmatism because every person has it upon whose attention it has been forced, that at the age of 38 or 39 he had been compelled to hold the paper farther away than heretofore. Presbyopia is not manifest in the emmetropic eye for half a dozen years later in life. He had astigmatism and probably anisometropia because of the fact that the crude spectacles he got from some optician, were, of course, simple plus spherical lenses, and both alike, and as they increased his trouble rather than lessened it he surely was astigmatic, and almost certainly anisometropic. He probably had heterophoria ("insufficiency" or latent strabismus) because long-continued eye-strain from the causes mentioned usually produces this imbalance of the external ocular muscles. He had retained, or normal, visual acuteness because, as is the almost exceptionless rule, that, when a vicious eye-strain reflex spends its strength on other organs, cerebral or digestional, the eye itself is spared. If Huxley had had persistent ocular symptoms such as conjunctivitis, amblyopia, etc., he would not have had the systemic symptoms, gastric, digestional, etc., which he endured for fifty years. The superlative impor-

tance of the function of vision to the organism, animal or human, has made Nature, with perfect wisdom, turn the harmful eye-strain reflex upon other organs than the eye. Huxley's eye-strain symptoms correspond in a general way to those of others but with the inevitable differences and peculiarities of all biologic phenomena. We must remember that his extraordinary energy of mind and body gave him noteworthy powers of resistance and recuperation. This demonstrates all the more convincingly the single nature and cause of his sufferings. The immediate cessation of the effects of eye-strain when he walked from ten to sixteen miles a day, or climbed mountains, or tramped the moors, shows at once the natural ruggedness and health of all his organs, and the single cause of his ill-health. Lectures, teaching, experimental work, etc., would have doubtless given him relief from eye-strain, if he could have had a stenographer, or some one to read aloud to him, and if he had not himself read useless things.

• The mounting of the childhood curve of symptoms to a crisis came at about the age of 14, when there was the strange experience he so naively describes as if resulting from his attendance at the dissection table. From it Huxley dates the beginning of "the half-century of co-tenancy of dyspepsia of his fleshy tabernacle." The emotional revulsion against dissection was plainly a part but a very small part of the cause

of the "co-tenancy." At 21 Huxley's use and abuse of his eyes caused an attack of conjunctivitis which lasted for several months. The resistance of the cerebral and digestional organs to the morbid reflexes, a resistance greatest at this time of life, threw these reflexes back upon the eyes themselves. During the next seven years all organs withstood the strain the best, but at 28 reading before breakfast caused headache for the rest of the day, and he had such a bout of ill-health that he changed the habits of his life, quitting study at 12 o'clock at night, and rising at 8 A. M. 'He had now to take a vacation to banish "dyspepsia, hypochondria, and other town afflictions," and he began to learn that if he worked his brain much he had stomach trouble and not even the fresh breezes of Tenby would enable him to recuperate. It is, of course, absurd to think that in Huxley brain-work alone could have such a result. He knew better well enough. His "head or will could never," as he later said, "have too much work." But eye-labor always and quickly brought an end of the "nervous energy" necessary for digestion. And so as in the lives of all those we have studied began the "tramp, tramp, tramp," in the open air, which alone gave relief. And even with this the "headache, headache," dyspepsia, and dyspeptic nausea, hypochondria, and apathy, continued and grew worse, and prove tragic until about the age of 48 or 50, when there was some relief last-

ing eight or ten years. This period of partial relief is illogical on the theory of unrelieved eye-strain, as it usually does not come until at about the age of 60, at the completion of accommodation failure. It would surely be readily explainable if we had all the facts of hand, and had not to deal with hints, unintended suggestions, overhearings, etc., as to the actual clinical history. I suspect that at the age of 48 or 49 when there was some change for the better in his general symptoms, there was a considerable lessening of eye-strain from some spectacles which he would now be compelled to catch up somewhere, in order to decipher print. Ten years previously he had felt the need of lenses, had tried such as he could get, but with these the ocular pain was worse and he struggled on for the next years of his severest trials. That his relief from 49 to 59 came from the relief of eye-strain is to me indubitable, and although it was not then possible that his error of refraction could be at all accurately corrected, there are many things that could have cooperated to lessen the results of abnormal ocular function. His presbyopia, which had become manifest at least six years earlier than usual, shows that his ametropia was of a high degree, and the guess-work spectacles could have had any one of a number of effects. While the spectacles, in the long run, were harmful, or at least not accurately corrective, still they helped to give some kind of more or less morbid relief. Moreover,

accommodation in his case was failing fast at 50; lastly it would have been strange if in thirty-six years Huxley should not have learned, even if blindly and empirically, how far he could go in the use of the eye without too much injury. However much or little he may have temporarily bettered, there was a distinct recrudescence of all symptoms at the age of 59; and he was driven to resign his public offices and again to attack the moors, where, even now, walking ten or sixteen miles a day again brought health and happiness. His demon, as of old, could not stand sharp walking. This fact strongly suggests that he had always and still had an unsymmetric or anisometropic astigmatism which could not then have been even approximately corrected and of which the direct irritating results would continue until presbyopia was complete; the secondary consequences might last for the remainder of life.

"Let me," says Huxley, "confine myself to the one matter on which my experience as a student of medicine, and an examiner of long standing, who has taken a great interest in the subject of medical education, may entitle me to a hearing. What is the object of medical education? It is to enable the practitioner, on the one hand, to prevent disease by his knowledge of hygiene, and on the other hand, to divine its nature, and to alleviate or cure it, by his knowledge of pathology, therapeutics, and practical medicine. That is his

business in life, and if he has not a thorough and practical knowledge of the conditions of health, of the causes which tend to the establishment of disease, of the meaning of symptoms and of the uses of medicines and operative appliances, he is incompetent, even if he were the best anatomist, or physiologist, or chemist, that ever took a gold medal or won a prize certificate. To understand the nature of disease we must understand health, and the understanding of the healthy body means the having a knowledge of its structure and of the way in which its manifold actions are performed. Physiology is, to a great extent, applied physics and chemistry. What we call therapeutics has to do with the action of drugs and medicines on the living organism.¹ And there is no position so ignoble as that of the 'liberally-educated practitioner,' who finds himself with the issues of life and death in his hands, ignorant, blundering, and bewildered, because of his ignorance of the essential and fundamental truths upon which practice must be based." ("University Education," Huxley.)

These words, from the Johns Hopkins address, were spoken in the fullness of his powers, by the physiologist, par excellence, and the "student of medicine," who thought himself and was indeed in one way, especially well fitted to speak with authority upon the subject; but he had been, as we know, a profound

¹ A small part of therapeutics nowadays.

sufferer all his life from some disease which baffled his best medical advisers, and of which he said, "I wish I knew what is the matter with me." One of the most fundamental and important of the senses, one of the greatest of physiologic functions, the origin and creator of intellect, is vision. Of its physiology Huxley was incurious. Its malfunction in his case wrecked his life and when he read, made every day a day of wretchedness. Whenever he read or wrote he suffered, whenever he stopped reading or writing he was well. Notwithstanding this Huxley wrote "The Method of Zadig."

• ROBERT BROWNING. •

CHAPTER V.

ROBERT BROWNING.

WHEN, in 1845, Robert Browning fell in love with Elizabeth Barrett, he was 32 years of age. The first quotation given below from one of the early letters shows that while certainly not connected, his headache began about the same time. Up to this time he had been free from such symptoms. Let me gather a few of the many allusions in two years' correspondence to the symptoms of ill-health of which he complained or to which Miss Barrett referred:

"I have had a constant pain in the head for these two months, which only very rough exercise gets rid of. I thought I could never be unwell." (May 3, 1845.)

"I am quite well now or next to it—but this is how it was. I have gone out a great deal of late, and my head took to ringing such a literal alarum that I wondered what was to come of it: and at last, a few evenings ago, as I was dressing for a dinner somewhere, I got really bad of a sudden and kept at home. Next morning I was no better." (May 12, 1845.)

How is your head? (E. B. to R. B., May 27, 1845.)

"You will have advice, will you not, if that pain does not grow much better directly? It cannot be prudent or safe to let a pain in the head go on so long and no remedy for it be attempted? You cannot be sure that it is merely a nervous pain and that it may not have consequences, and this quite

apart from the consideration of suffering?" (E. B., June 7, 1845.)

"I am confident that that pain should not be suffered to go on without something being done. What I said about nerves related to what you had told me of your mother's, suffering and what you had fancied of the relation of it to your own. Not that I believe in the relation . . . because such things are not hereditary, are they? and the bare coincidence is improbable. You see it is just as I thought—for that *whether too much thought or study did or did not bring on the illness— . . . yet you admit that reading and writing increases it*—as they naturally would any sort of pain in the head. . . . If it does you good to go out and take exercise, why not go out and take it? If you will agree to be well, *first*, I will promise to be ready afterwards to help you in anything I can do—transcribing or anything to get the books through the press in the shortest of times. I am capable of a great deal of that sort of work without being tired, having the habit of writing in any sort of position, . . . on the arm of a chair, or the seat of one, sitting myself on the floor and calling myself a Lollard for dignity. . . . Do give up the writing and all that does harm." (E. B., June 24, 1845.)

"I fear I shall not be able to bring you the rest [of the MSS.] to-morrow because I have been broken in upon more than one morning; nor, though much better in my head, can I do anything at night just now." (July 9, 1845.)

"Are you any better to-day? . . . Will you attempt to do none of the writing which does you harm—nor of the reading even, which also may do harm?" (E. B., July 25, 1845.)

"Let me try and answer your note to-morrow. I will not hide from you that my head aches now." (July 28, 1845.)

"To-day I cannot write—though I am very well otherwise." (July 31, 1845.)

"And your head, how is it?" (This query of Miss Barrett occurs in fully one third of her letters.)

"So much reading hurts me; . . . whether the reading be light or heavy, fiction or fact, and so much writing—

whether my own—such as you have seen, or the merest compliments—returning to the weary tribe that exact it of one.” (August 8, 1845.)

“How can it be that you are unwell again, and that you should talk of being weary in your soul! You? What should make you weary in soul? Or out of spirits in any way? Or is it that, being unwell, your spirits are affected by that?” (E. B., August 25, 1845.)

“Do take more exercise this week and make war against those dreadful sensations in the head.” (E. B., August 31, 1845.)

“And my all important headaches are tolerably kept under—headaches proper, they are not—but the noise and slight turning are less troublesome.” (September 5, 1845.)

“How is the head? I fancied the other day you were looking better rather than otherwise; but those sensations in the head are frightful and ought to be stopped by whatsoever means.” (E. B., November 21, 1845.)

“And now that the headache has begun again, and the worse than headache—” (E. B., November 25, 1845.)

“When your brother and I took the book between us, we turned to the index between us and stopped at ‘Miss B.,’ and he, indeed, read them or some of them, but holding the volumes at such a distance as defied my short-sighted eye, that all I saw was the faint small characters.” (December 9, 1845.)

“I will not try to write much to-night, for my head gives warning.” (January 26, 1845.)

“To my sorrow, I must give up the delight of seeing you this morning. I went out unwell yesterday and a long noisy dinner¹ with speechmaking and long walk at the end of it—these have given me such a bewildering headache that I really see some reason in what they say here about keeping the house.” (February 7, 1846.)

¹ Called to-day theater-headache, panorama-headache, crowd-headache, etc., and often occurring in astigmatic patients.

"I am rather hazy in the head." (March 18, 1846.)

"For all the walking my head aches." (March 24, 1846.)

"Do you notice how stupid I am to-day? My head begins [to ache] again; that is the fact; it is better a good deal than in the morning. With the deep joy in my heart below, what does the head mean by its perversity." (March 29, 1846.)

"Say how are you to-morrow—don't forget. The cause of the unwellness I see; if you do not. It was the proof correcting—I expected that you would be unwell." (E. B., March 31, 1846.)

"I confess to have written myself all, but—tired—headachy." (April 7, 1846.)

On April 21, R. B. writes: "My love must sit to-day in the gondola chair and let me talk to-day—not *write*—to her, for my head aches—part from pure perversity and a little from my morning spent over a novel of Balzac's—that is it, not any real illness I know—however the effect is the same." To which E. B. responds, April 22, 1846: "How could you get that headache? First with not walking; then with walking! and reading Balzac!" To this R. B. answers, April 23, 1846: "I was never very ill and am now much better. I mean to cooperate with your wishes and my doctor's doings and so, how should I fail of bringing into subjection this restive ill-conditioned head of mine?"

"I scarcely know what to say about the poem. It is almost profane and a sin to keep you from writing when your mind goes that way—yet I am afraid that you cannot begin without doing too much and without suffering as a consequence in your head." (E. B., May 26, 1846.)

"I will write more to-morrow—the stupid head will not be quiet to-day—(my mother's head is sadly affected too) partly because I have been reading." (June 2, 1846.)

"I think my head is dizzy with reading the debates this morning." (June 30, 1846.)

"Since you *will* be teased with intelligence about it, my head was not very well yesterday, but it is decidedly better this morning." (July 20, 1846.)

"I was not quite so well this morning early, but the little head there was to go, has gone, and I am about to go out. My mother continues indisposed. The connection between our ailings is no fanciful one. A few weeks ago, when my medical adviser was speaking about the pain and its cause (my mother sitting by me) he exclaimed, 'Why, has anybody to search far for a cause of whatever nervous disorder you may suffer from, when *there* sits your mother whom you so absolutely resemble! I can trace every feature,' etc." (August 22, 1846.)

• "I write with an aching head." (August 31, 1846.)

"My head will not get quite well." (September 2, 1846.)

"When I had finished that letter this morning, before I could seal it even, I became quite ill and so sick as to be forced to go upstairs and throw myself on the bed." The next day (September 4) he writes: "I am very much better—my head clear from pain if a little uncertain." Again on September 5 he writes: "My head still teases rather than pains me." Two days later he writes: "I am not to see you to-morrow. I got up with the old vertiginousness or a little worse, and so went to consult the doctor—I am bidden to go to bed for a day or two. So here I am writing, leaning on my elbow in bed, as I never wrote before, I think. Mind, I may read or write—only in bed I must lie, because there is some temperature to be kept up in the skin—or some other cause as good—"for reasons, for reasons." The next day he writes: "Here I lie with a dizzy head—unable to read more than a page or two—there is something in the unwonted position that tires me—but whenever the book is left off, I turn to the dark side of the room—and so I am soon better and able to try again." The following day "the lightness, slight uneasiness of the head continues, though the general health is much better, it seems."

"Each summer brought him to the state of nervous prostration or physical apathy." (Mrs. Orr in "Life of E. B. B.")

"Liver," "deranged liver," etc., is the complaint made, "though no doctor pronounced the evil serious." (Mrs. Orr.)

He caught a "bronchial cold" in Venice, just before his death, and the symptoms were aggravated by "the asthmatic tendency," and "exhaustion of the heart." He laid it, as usual, to the liver.

He died December 12, 1889, at the age of 76.

"He was very proud of his retentive memory, and of his well preserved sight. The latter he attributes to his practice of bathing his eyes in cold water every morning. He was proud too of his strength, of his power of walking for hours without fatigue, of the few requirements of his Spartan-like daily life." (Katharine De Kay Bronson, *The Century Magazine*, February, 1902.)

Browning was a man of refined and sensitive nature, self-controlled, careful of himself and of his health, a perfectly well-regulated man, living temperately in all things, well-to-do, and with no need, by inheritance, or conditions, ever to go to any extreme in life. He had been remarkably well, he informs us, up to the age of 32. If we had accurate data prior to this time we should doubtless find that the moderation and quietness of his nature and demeanor were in great part the lessons unconsciously derived from the forgotten experiences as regards health in youth. A boy with the astigmatism he had could never have been a hard student or immoderate in any way without ill-health resulting. After the time we know him (32) we find him always extremely sensitive to slight excesses of irritation, such as a late dinner, excitement, etc. It never needed but a small thing to upset his delicate health. Even reading a few minutes would

bring on the head trouble, and a few minutes of ocular rest would make it disappear. Each winter's work (with the eyes) brought him to the state of nervous prostration and physical apathy, and, as of old, it was charged automatically to "liver, deranged liver," although the evil was "not serious," and he had no organic disease whatever. For the twenty months of the time of the letters, the only time we get any very definite insight of his life, he was plagued and tormented by what he called headache, but which Miss Barrett said was worse than headache. Vertigo, or, as he wrote, "the old vertiginousness," "dizziness," "not headaches proper but the noise and slight turning," "ringing in the head," "lightness," "haziness," etc., are other terms used to describe it. Like Huxley he found that he must take long walks every day in order to be free from suffering, and like him he also found he must give up use of the eyes at night. There are also crises of "nervous prostration," "weariness of soul," "physical apathy," all relieved at once by walking. There is one noticeable difference between Browning and Huxley in the time of the onset of the ocular reflexes. In Huxley's powerful and tough system they did not begin immediately, but seemed to culminate in the crises at longer intervals and more severely. In Browning's case they came at once with a very little reading or writing. Sometimes a few minutes' reading would produce them, and a

few minutes of rest give relief. This is according to the rule; when the insult of the reflex expends itself upon the cerebrum the symptoms show the closer and quicker nexus; when upon the digestional system they are slower in appearing. The more sensitive the nature, the more the reflex tends to be cerebral, the more resistant, the more it tends to be digestional. Carlyle and Huxley would, therefore, not have headache so much as dyspeptic or "liver" symptoms. Browning had chiefly, though not solely, the cerebral type of reflex. The worst kind of organization is that in which there is a balance, or such a combination of the two that the reflexes affect both sets of organs. The result in these cases is "biliousness," "bilious headache," or "sick-headache," one of the most awful affections and most frequent which afflicts humanity. The case of Darwin is an illustration. In Browning's case, although according to the fashion, he occasionally blamed the "liver," and sometimes had nausea, the headache and the dizziness, with other odd symptoms of cerebral disorder were the chief complaints. He was a man without organic disease, living a temperate life of ease, and yet in the prime of life, with every attempt at reading, writing, or correcting proof, he found himself with headaches and vertigo; immediate relief came by stopping near use of the eyes, by walking, etc. Nothing can be more certain in diagnosis than that a man with such symptoms is suffer-

ing from reflex ocular neurosis. Miss Barrett saw the close connection between proof-reading or writing and headache, although Browning seems not to have noticed it, even in writing the words which he said caused it.

But is there no better proof? Zadig shall again help us. Browning says that with a book between himself and Mr. Barrett, "he [Barrett] indeed read, but holding the volume at such a distance as defied my short-sighted eye, so that all that I saw was the faint small characters." These last words cannot of course be taken literally, *i. e.*, it was not the faint small characters alone of the page that he saw, the large clear letters not being seen. His symptom-description was as incorrect and obscure as some say his poetry frequently is. He meant that at the distance Barrett held the book all the letters appeared small and faint. There is no form of ametropia which increase of distance would make faint small characters appear more visible than large clear ones. Moreover, it could not have been simple "short-sightedness" which Browning said he had, that produced the impression of faintness and smallness in the letters when held far away. Patients have yet to learn the facts about the optical terms commonly used. A "far-sighted" man may not be really far-sighted, and a so-called "near-sighted" man may not in fact be near-sighted. That is to say, a man with a high degree of far-sightedness,

or hyperopia, may be unable to see far-off things clearly, and a "near-sighted" man may not be myopic, as several defects, especially amblyopia, may compel him to hold the book very close to his eyes. The presence of complicating astigmatism and amblyopia may make the word "near-sighted" have no literal or scientific significance. Simple myopia (near-sightedness) could not have the effect Browning described, nor could simple hyperopia (or far-sightedness). Moreover, these simple isometropic defects of either kind would not produce the reflex headaches and vertigo plainly due to his eyes. It is only astigmatism that could have produced both the pain and the "faint small characters," and an astigmatism which could no longer be neutralized by the muscle of accommodation. That by care and ease of life Browning reached the age of 32 without severe symptoms of eye-strain and ill-health shows that at that time a greater amount of writing and reading was undertaken, or that the astigmatism could no longer be overcome by the ciliary muscle or the function of "accommodation." Possibly both causes were operative, the latter dominating. That the astigmatism was hyperopic and not myopic is also certain or extremely probable, and it must have been of a high degree or he would not have thought himself "near-sighted." This "near-sightedness" was doubtless also heightened by amblyopia, for a high degree of hyperopic astigmatism existing uncorrected

for thirty-two years almost certainly produces amblyopia. All patients think such amblyopia is "near-sightedness," because to see print plainly they have to force the page closer than the fourteen-inch normal, and conversely when the page is held say at two feet or more away the letters become "faint and small."

I have noted that, once, walking did not cure Browning's headache, and Miss Barrett glanced at the fact with her keen diagnostician's eye. The contradictions she caught him in as regards the cause and cure of his headache at this particular time, should not be taken too seriously. While Cupid blinds men he makes women almost supernaturally clairvoyant. Browning's own reportings of his case are less clear and truthful in what he really says than in what he implies or unintentionally says.

The glimpses we get of the medical attendant are not encouraging. In one respect his therapeutics resembles that of some modern rest-curers who send patients to bed and allow them to read there, as Browning did, when the cause of their "neurasthenia," etc., is due to eye-strain. Then there is wonder that the rest-cure did no good. Others stop the reading and writing while the patient is in bed, and there is a speedy return of health—followed, with near use of the eyes, by a "breakdown" as prompt. Browning is sent to bed in order that "some temperature shall be kept up in the skin (sic!), or for some cause as

good, at least, 'for reasons, for reasons.' " And he may read and write, so he stays in bed, although it causes headache at once to do so, and whenever the book is left off and he turns to the dark side of the room he is relieved and is able to read another page.

Both Browning and the medical adviser find a perfect explanation of Browning's headache in heredity. "Why has anybody to search for a cause? There sits your mother whom you so absolutely resemble! I can trace every feature, etc." If this explains it, Adam, or rather, Eve, must have been afflicted in the same way, and all of her descendants to Browning's mother. One marvels how a headache can be inherited, and why family facial resemblances demonstrate the fact. Throwing the responsibility back upon the mother, or upon Eve, will no longer do, and I think we should give it up. Browning and his medical adviser may not be censured for such a naive medical philosophy, but really we grown-ups must quit such hide-and-go-seek childish games. We must find what caused the headache in each case, separately, of son and mother, at least if we wish to cure the son. An antihereditive medicine has not so far been discovered effective after the patient's birth.

For forty-two or forty-three years after this Browning lived, but I find few data of value or trustworthiness for further knowledge of his clinical biography. Like De Quincey, Carlyle, Darwin, and Huxley,

Browning never suspected the cause of his suffering, and learned only that it was in some mysterious way eluded by long walks and persistent exercise. Mrs. Bronson says he never passed a day without taking one or more long walks; indeed, his panacea for most ills was exercise, and the exercise he chiefly advocated was walking. He wrote:

"I get as nearly angry as it is in me to become with people I love when they trifle with their health,—that is, with their life,—like children playing with jewels over a bridge-side, jewels which, once in the water, how can we, the poor lookers-on, hope to recover? You don't know how absolutely well I am after my walking."

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BILIOUSNESS AND HEADACHE.

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CHAPTER VI.

BILIOUSNESS AND HEADACHE.

ACCORDING to the composite medicine and psychology of the ancient and mediæval philosophers there were four cardinal liquids, or humors, of the body, which, according to the predominance of one, and the mixture of all, were supposed to form the temperament, temper (*temporo*, to mix), or disposition of a man. These humors were called the blood, the phlegm, the choler, and the black choler. We to-day say of one that he is sanguine, phlegmatic, choleric, or melancholic, and the meanings are not much different from those given them for the past 2,000 years. If a horse has a certain affection he is said to have the distemper, that is, the four humors are badly mixed, and our terms, *good-tempered*, *good-humored*, *in a temper*, *bad-humored*, etc., show how thoroughly this old humoral physiology was believed and worked into our language and our habits of thought. Even our word, *humor*, meaning wit, is derived from the same source. The blood has retained its old significance. Phlegm we understand now as the viscid mucus of the inflamed upper air-passages (*φλέγειν*, to burn), and the choler, or yellow bile, we also know. But

what could have led to the belief in a black bile or choler? As near as we can say, it was a blunder due to the lack of a scientific spirit in anatomy and physiology. The liver secreted choler or yellow bile, and the renal and suprarenal glands were believed to secrete black bile or *atrabilis*, whence our obsolescent word, *atrabiliary*, used as late as 1849 by Lowell, 1866 by Carlyle, and even in 1877 by Froude. Two things were thus supposedly explained by the theory of the humors: The first that mental qualities, character, and disposition, were thus formed. Science, or scientific physiology, thus began with an unconscious materialism and fatalism—the material construction and functions of the body inevitably produced and dominated character. Perhaps this old snake of superstition (or, preferably, “substitution”) is not yet wholly dead; Weissmann, Lombroso, and the scientific monists are still able to stimulate some wriggling of its tail, but a wise psychology smiles cynically at the crude galvanistic experiments.

The second conclusion of the humoral theory was the humoral pathology, that all diseases are due to disorder and abnormalism of the humors. We were early able to exclude the black bile from the pathogenic role because there is no black bile. Perhaps the gloomy hypochondriac *should* have some black bile to explain his despair in such a world as ours, but it must evidently be accounted for in some other way. That

one who is physically sanguine should be emotionally so we no longer believe, and that pharyngitis or bronchitis has any power to produce psychic phlegmatism is hardly consistent with sound laryngology.

But how is it with the yellow choler? Is there any doubt that Carlyle (and thousands of sufferers from similar diseases) thoroughly believed his daily wretchedness for forty years was due to "bile"? Sir Andrew Clark told the patient Huxley he had a better color, *i. e.*, less choler, than when he sent him to Italy. Biliousness was a very real complaint to the physicians of the past century, and try as they may the writers of modern medical books can not abolish the word "bilious." As to the lay world that word is used almost every day in almost every household in the land, and to the users it signifies some mysterious connection with hepatic function and product. Quackery may be said to feed upon biliousness (which may explain its extraordinary gall!), and the quack or the physician who could cure it by any medicine would be the most successful physician in the world. For it is evident that in some mysterious way this most mysterious of diseases is responsible for a big round share of the world's suffering.

But what is it to be bilious? I have asked many men and more books, and no two answers are alike, no two reconcilable. Originally, of course, it must have meant the secretion of too much bile, as pre-

dominance of any one of the humors made the individual physically and mentally the exponent of the qualities of that humor. But, although this error will still persist for long, there are a hundred opinions and conditions and facts, which make it impossible to hold it with any degree of absoluteness or consistency. Of Ben Thompson, the noted desperado of Texas, one of his sympathizers said, "Ben is a little bilious, but he will come all right again as soon as he has killed a man." There are many such supposed connections between biliary, psychic, and sociologic functions.

To the lay mind the logical and physiological connection between ill-temper or choler, and derangement of the liver, was so unquestionable that the conclusion was inevitably drawn that if a man were fault-finding and bad-humored he must certainly be pathologically bilious. Probably that logic has incited more purge-taking and dyspepsia-treating than the profession would now care to acknowledge. Traces of it may be plainly seen in the text-books of to-day, but the fact is undoubted in those of fifty or one hundred years ago.

But those were good and wise books nevertheless—quite as helpful, much more so, even, as those issued from the press last year, so far as pertains to this subject. Let me make a few selections from two of these old books by Drs. Watson and Tweedie, and written about sixty years ago:

"There are states of mind and habits of life, which, having no direct relation to the organs of digestion, yet exercise a material influence over their functions. Mental distress; mental solicitude; mental toil; over-much study; want of exercise: these are all prolific sources of dyspepsia. . . . Prescribe *change*: change of air; change of place and of scenery; change of society. Get him to *travel* in search of health; and the chances are in favor of his finding it. Six weeks among the mountains of Switzerland, etc. . . . with these disjointed hints, gentlemen, I must request you to be satisfied in respect to the principles upon which dyspepsia—and the hypochondriasis which is generally so closely linked with dyspepsia—are to be managed. A full discussion of these subjects in detail would furnish matter for several lectures."

"Indigestion is often accompanied by pain in the head, with some confusion of thought: or at all events with a loss of mental energy and alertness. Together with a violent headache there are frequently nausea and vomiting; and the complaint is popularly known by the name of the *sick-headache*: or, in the fashionable jargon of the day, as a bilious headache."

" . . . Scarcely a winter passed over in which several of his pupils did not apply to him on account of palpitations supposed by them to depend upon structural disease of the heart: and in no single instance were these apprehensions well founded. They were all cases of mere dyspepsia and hypochondriasis." Cullen defines hypochondriasis to be *dyspepsia*—cum languore, mæstitia, et metu, ex causis non æquis.

"The symptoms of acute dyspepsia are anorexia, weight and fullness at the epigastrium, nausea, eructations, . . . dull headache along the supraorbital ridge, confusion or incapacity of thought, and despondency. . . . The evacuation of the stomach is generally followed by a feeling of great relief, and the sympathetic disorders soon subside. . . . Another form of acute functional disorder, to which the stomach is liable is what passes under the popular term bilious seizure. Many

of the symptoms in this affection are the same as in the former, but the spontaneous sickness is more violent, etc. . . . The attack is generally preceded by indisposition, languor, dulness, chilliness, loss of appetite, and giddiness. Some can foretell its approach by derangement of sight, consisting of general indistinctness, or a sensation of darkness, etc. . . . Such persons are constitutionally liable to such disorders, and are said to possess the bilious temperament."

"In chronic dyspepsia the symptoms are almost coextensive with the whole economy, . . . discomfort, indisposition, lassitude and an aching weariness, which patients often designate emphatically as wretchedness. . . . Dejection, anxiety, irritability of temper, and incapability of taking pleasure or interest in anything whether in the physical or moral world. . . . *Muscae volitantes*, . . . headache particularly over the eyes."

"Gastralgia is an affection that corresponds to the gastrodynia and cardialgia of some authors, the morbid sensibility of the stomach described by Dr. James Johnson, and the irritable gastric dyspepsia of Dr. Todd. . . . Temper irritable, . . . costive, . . . headache of a tense character, . . . prey to morbid gloom."

"As to the restriction of diet, patients say that their friends partake of all such things; but the best answer to such remarks is, that, as 'to the pure all things are pure,' so, in our sense, to the whole all things are wholesome."

"Without insisting on the general physiological doctrine of the despondency of glandular action upon the nervous system, we may remark that various pathological phenomena lead to the recognition of an organic influence exerted by the brain over the biliary function in particular; but we shall find that it is not always very clear whether it is the secretion or excretion of the bile that is primarily affected in this manner. . . . The recognition of a class of maladies, termed *bilious*, without the precise significance of this term having been clearly defined. Some physicians understand excess of bile, others deficiency, or when it is vitiated, others extend the term

to all derangements of the digestive functions, attended with any form of biliary disorder."

"We have little, in the way of palliation, in our power. . . . It must be admitted that the knowledge we at present possess of the biliary secretion in health and disease does not enable us to lay down any rational indications for the correction of its morbid conditions."

If we turn from the pathology and practice of sixty years ago to that of to-day do we find anything more helpful? I do not think so. As to these matters our most modern books seem to me to be infinitely less helpful. When the young medical graduate goes out to treat patients these most common complaints and tormenting complainants will turn up the first day and every day. He has not as a rule been taught in book, lecture, or clinic, anything half as good as was taught the student of the olden time. In the first place his most newest Practice of Medicine Bible will probably ignore the real Practice of Medicine pretty thoroughly. It is made for the author's benefit, not for that of the student. It is theoretical not practical, "diagnostical not therapeutical." And just in proportion to the author's fame will it be so. In the second place it has usually succeeded in ignoring functional diseases altogether, whereas the functional diseases produce far more suffering than the organic diseases. I believe that these troubles labeled *bilious* and *headache* alone cause more wretchedness than all the organic diseases in the world. And yet little or no simple common help

will the puzzled young doctor get from most of the modern books. They are all very scientific, it is true, and it is all very "magnificent, but it is not war"—at least against disease. The modern patient as a last resort can also be waved to Switzerland, if he is rich enough to go, or to the dispensary if he is one of the 999 in 1,000. Book after book will utterly ignore these subjects, or only speak of the symptoms in a score of different places as those of a score of different organic diseases, always however as a bit of necessary routine, mechanically, because others have done so, etc. Out of many I have found two that cursorily allude to eye-strain as etiologic factors, but plainly without any thought or care for the subject, and stupidly understanding by the term the over-use of normal eyes, instead of the use of optically abnormal eyes. From a very up-to-date book I quote the following:

"... At the same time, owing to the absorption of poisons into the system, certain constitutional symptoms are noticed such as a sense of fatigue, oppression, vertigo, headache, and a disturbance of sight. The complexion may be more or less muddy, having lost its clear character. Such a collection of symptoms is usually placed under the head of 'biliousness,' and not without reason, as the liver is no doubt inadequate to the proper arrest of the ptomaines, found in such large quantity."

"An objection to these views may arise from the fact that many individuals suffer for years from chronic constipation and maintain a fair standard of health."

"It is however a well-known fact that individuals suffering from chronic constipation frequently exhibit symptoms of

biliousness, such as headache and vertigo, as well as many mental peculiarities, hypochondriasis, tendency to melancholia, etc. These are no doubt the result of . . . action of ptomaines upon the nerve centers. . . . If the power of the liver as a sentinel is lessened, the toxins ordinarily found in the digestive tract may circulate through the system producing many of the symptoms of biliousness."

We are also told by this author that disturbances of innervation cause acute and chronic congestion of the liver and that in biliousness more or less hepatic insufficiency exists, whether primary or secondary. The primary may be of a hereditary character, slight secondary causes provoking nervous exhaustion may produce it, and neurasthenic cases are frequently explained by derangement of the liver, and that mental emotion influences the liver secretion. Other symptoms are: bitter taste, dyspepsia, cardiac irregularity, characteristic alvine evacuations, nervous phenomena, especially headache as a dull pain in the forehead, vertigo, dimness of vision, double vision, and sleeplessness. The treatment consists in increasing the secretion of bile, etc.

One naturally expects to find that the last days of humoralism would be humorous! Perhaps in his desperation a multivolumed cyclopedia is bought by the young practitioner only to find that in the parcelling out of subjects great gaps exist which should be filled with the discussion of the subjects of greatest interest. Headache, for instance, is either not in the list of

subjects written upon, or is only spoken of in the dead lists of symptoms of a hundred diseases. In one such "system," however, I have found many pages of matter upon this topic in which the forms are duly enumerated and each at length described; it would take a page or two merely to list the chief heads of paragraphs, the nervous headache, sick, periodical, hereditary, constitutional, dietary, hemicranic, menstrual, indigestional, or bilious headache; that from mental or bodily overwork, of childhood, of tubercular meningitis, of school children and students, from affairs of family and business, of bad ventilation, of malaria, of rheumatism, of uterine diseases, from constipation, of hysteria, of diseases of the brain and spinal cord (tumors, abscess, etc.), of fevers, of anemia, of delayed menstruation, of syphilis, and so on, and so on. "Finally," not to forget the "quibusdam aliis," of the "omni re scibili," finally there are headaches that find no place in the preceding enumeration and that defy all attempts to find their cause or explanation"—and "many cases of headache cannot be relieved by removing the cause. . . . Many patients should spend as much of their time out-of-doors as possible."

"In explaining the recurrence of periodical headaches, the theory seems rational that supposes a nerve explosion or storm to occur at stated intervals, regardless of exciting causes, as the centers reach a climax of accumulation or exhaustion of energy or of some force or principle. Such an unavoidable occurrence is exactly what happens; a seizure

will come when the time is ripe for it whatever is done to prevent it. . . . The explanation of reflex headaches is nothing more nor less than the explanation of reflex pains of other parts of the body, and may be omitted here."

"The sympathetic or reflex influences cause a large number of headaches. These influences are almost innumerable. Among them are"—(not eye-strain, astigmatism, etc.). . .

In place of the thousands of years of medical superstition and pseudoscience, in place of the meaningless, self-contradictory and mutually contradictory disquisitions upon these subjects, in place of the endless endings in the clouds of practical helplessness and therapeutic nihilism, even of quackery, it would seem advisable for future lecturers and text-book makers to insert a few sentences somewhat like the following:

Even up to the last years the diseases called biliousness, headache, dyspepsia, acute lithemia, and by many other terms, were entirely misunderstood and treatment was in the highest degree unsatisfactory. But there was brought into practical use during the last quarter of the nineteenth century a discovery of as great medical importance as any made during the century, and so far as the relief of actual suffering is concerned, of far greater significance than any. Astigmatism, its influence upon the general health and character, and the methods of correcting it, is the discovery of which we speak, and with the discovery the last great stronghold of the ancient and medieval superstition of the humoral pathology was taken. Whenever

the symptoms of functional cerebral, mental, and digestive disease, such as headache, dyspepsia, "biliousness," sick-headache, migraine, neurasthenia, anemia, vertigo, insomnia, anorexia, constipation, eructation of gas, languor, ill-temper, melancholia, etc., are temporary or acute and dependent upon well-known excess or abnormalism in eating and drinking, the patient is more than stupid if he does not tell you of the fact. When these symptoms are dependent upon organic disease you are equally inexcusable if you do not soon discover it. The vast majority of such cases, say, at least 90 percent, are not caused by dietary indiscretion or organic disease, and of these over 90 percent are reflex ocular neuroses; i. e., due to "eye-strain"—a term denoting morbid function, not over-use of normal function. Most eye-strain is due to astigmatism, but astigmatism and all its dependent ocular and general results is not to be corrected by the oculist whose motive is fame, success, or money. It is not corrected by machinery, or without a mydriatic. The work of the optician also conditions success, and recorreption is necessary every year or two.

The trend of medical opinion may be seen from a recent editorial in the *Lancet* of August 23, 1902:

Chronic dyspepsia has from time immemorial been one of the greatest opprobria of medicine. Judicious medicinal and dietetic treatment relieves many of the cases, but there are still many remaining in which all ordinary treatment fails to do

any permanent good. The immediate danger to life is small—for here we are not speaking of malignant disease—but existence is a burden. Unless the greatest care is devoted to the diet discomfort and pain will torment the patient for hours after a meal and often relief will only be obtained when the stomach rejects its contents. Sometimes the vomiting may be profuse, many pints being brought up. The food, whether ejected or retained, fails to nourish. Emaciation, often extreme, naturally follows. The sufferer, worn out with pain and weakened by lack of food, falls at length into such a state that death itself comes as a relief. Even when the symptoms are not so extreme they are sufficient to interfere with ordinary life. The patient is able to devote himself to only a very limited extent to his work. He cannot forget his dyspepsia; his mind is centred in his stomach; his diet, his beverages, his symptoms occupy his whole attention and he has none to devote to the ordinary concerns of life. Every medical man can testify to the correctness of this picture. Fortunately, such extreme cases are not very common, but instances of a milder type are often met with, and everyone must acknowledge how little relief is to be expected from drugs. There are doubtless some of these cases of disease which are functional in origin and in which the most minute examination of the stomach and abdominal viscera after death cannot reveal any lesion, but these form the exception, for in the majority of cases a necropsy will show some definite structural change to which may reasonably be attributed all the symptoms. For many years a connexion between these chronic dyspepsias and some definite organic disease of the stomach was hardly suspected. They were not cases likely to be detained in hospitals for any length of time and therefore would but rarely come to a necropsy, for post-mortem examinations are very exceptional outside hospitals. But it came gradually to be recognized that in many cases some definite structural change could be found, and now it may confidently be laid down that in the vast majority of cases of severe chronic dyspepsia the disease

is not merely functional but has an organic basis. The conditions discovered on examination are very various, but it is remarkable that a large proportion of them result from the healing of simple gastric ulcers.

From which, I judge, the lessons should be drawn that, long-continued functional disease assuredly begets organic disease; that it behooves us to learn what causes these long-continued functional diseases; that we should seek to prevent the necessity of surgical cures even if it be true that the surgical cure does in fact cure.

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SOME NEGLECTED POINTS IN
THE PHYSIOLOGY OF VISION.

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CHAPTER VII.

SOME NEGLECTED POINTS IN THE PHYSIOLOGY OF VISION.

WITH all the last-century study of the laws of optics and of the organ of vision, it is strange that the significance of so many ocular structures and functions has been misconceived or neglected. Most extensive investigations with the keenest ingenuity have been made upon the photochemistry of the dead retina,¹ and yet the important organs and essential functions concerned, in the living eye, in the avoidance of retinal exhaustion, and the reinstitution of retinal sensibility, have been left almost unnoticed. Theories of vision have been elaborated with tireless ingenuity, and yet the fundamental conditions of actual vision have not been recognized. All the theories may be left out of the attention if we wish to fix upon the fundamental fact and causes of retinal fatigue, and the methods and devices for reestablishing retinal sensibility. In truth the observation underlying all theories is that the persistent action of the light-stimulus or image upon one part of the retina speedily lessens and extinguishes the sensation-response. The more intense the

¹ Epitomized in the "System" of Morris and Oliver, Vol. I.

light the greater the injury, and the quicker it is produced. The reinstatement of sensitiveness is by means of shadings, darkness, and variations of the stimulus. I have seen no systematic and thoroughgoing statement of the devices, and the methods whereby this deterioration of function is prevented, and the resensitizing process is brought about. The matter is of so much practical significance that they deserve enumeration:

1. The shadows cast by the retinal arteries, veins, and capillaries, according to the direction and intensity of the entering light, are constantly shifted and modified, so that the retina behind them and in their immediate neighborhood is allowed variations of fatigue and recuperation. The most shaded portions serve perhaps as centers whence extends the mysterious resensitizing process.

2. Certain sensitive and trained eyes, when looking toward the sky or a bank of cloud, can see a multitude of little lights like pin-points flashing in and out of view all over the field of vision. These may be resolved into illuminated paths or lines of light, zigzagging everywhere and appearing and disappearing seemingly without law or order. These have been called phosphenes, corpuscular reflections, phoses, and aphoses.¹ They are the reflections from the blood-

¹ See an article upon the subject in the *Philadelphia Medical Journal*, July 22, 1899.

corpuscles of the capillaries of the retina, which, as they turn and twist along their routes, act as tiny mirrors to throw darting points or traveling lines of light upon all parts of the retina. These multitudes of corpuscles also, of course, cast unobserved shadows of themselves upon the retina. The reflections may also have a function in producing needed physiologic irritation in parts of the retina not habitually stimulated by the incoming light, and in this way keeping it in a state of preparedness or responsiveness.

3. The shadows of *muscæ volitantes* are probably of greater service. *Muscæ* should be recognized as of physiologic, not pathologic, significance. They exist in all eyes, although not usually recognized. Every part of the fundus of all eyes during the waking life is protected by these floating and waving *muscæ* shadows.

4. The retinal pigment extends so far toward the periphery of the retina that functionally it joins that of the iris in preventing all light, except that slight amount possibly transmitted through it, from entering the interior of the eye except through the pupil.¹

¹The strange tendency of xanthelasma and other pigment spots to appear upon the lids and about the eyes, bears witness to the difficulty of attainment of normal ocular pigmentation. This is still more striking in the pathologic dark rings or half-circles that appear about the eyes of girls and women suffering from anemia, chlorosis, and other forms of denutrition.

5. The iris-pigmentation is essential for retinal shading. The tragedy of albinotic eyes is largely due to iris-translucency.

6. The alternation of contraction and dilation of the pupil under ever varying light-changes and intensities varies the size of the retinal image, and in this way adds another to the agencies inducing changes of stimuli and rest.

7. The natural pigmentation of the skin in the non-albinotic gives added exclusion of useless and harmful light which passes more freely through the eyelid of the albino.

8. The function of the eyelashes has been supposed to be the protection of the eyeball from a striking body, which, first touching the lashes, is followed by reflex closure of the lids. I am convinced that the lashes are of little or no service of this kind, and that their predominant use is to screen the light and shade the pupil, while at the same time allowing the passage of sufficient light to give a useful image of an object above or below the eye. The existence of this function can be observed in others who are standing in sunlight, or in the photographs of sitters in open daylight, etc.

9. Winking has been explained as necessary for moistening and cleaning the cornea, and spreading the tears uniformly over the exposed surface of the eye. It has this function of course, but another, fully as important if not more so, is that of completely shutting

out the entire retinal stimulus for an instant thousands of times a day.¹

10. Binocular vision also serves more than would the cyclopean eye in breaking up the continuance of the stimulus of the retina upon any one spot.

11. Of greater importance than any single one of the preceding devices is that of the incessant movements of the eyes, those of the body and head aiding. In a child it is almost impossible to secure any steady fixation of the axis of vision, even for a few seconds, and the eyes of adults, when healthy, are thus held with difficulty for only ten or fifteen seconds at most. But the motionless stare of the blind or highly amblyopic eye is noticed even by the layman. This ceaseless motion of normal eyes produces a similar rapid variation of images, shadings, and rests of all parts of the retina in the region of the macula. The nystagmus of albinotic eyes may be defined as the ceaseless chase after a portion of the retina which may have been a little less exhausted than others by the terrible flooding of the entire retina with light.

12. The eyebrow does, indeed, have the subordinate function of leading water and the sweat away from the palpebral opening, but a more important use of it is to shade the eye. A noteworthy confirmation of this is the otherwise inexplicable growth of the eyebrow hairs

¹ Many animals wink little or not at all. Visual function is more perfect in man, and requires more mechanisms of shading.

in old men. A striking example is shown in the photograph of the scientist, Powell, in *Science*, October 10, 1902. I have sometimes had to cut off these long hairs in the aged in order to keep them from injuring the eye by incurvation against the eyeball. In old age the resensitizing process of the retina is more difficult owing to failing nutrition, etc., and there is a need for a still greater protection of the pupil from the incident light of the sun and sky. This is effected by the visor of the eyebrow which at this time of life frequently takes on a startlingly luxuriant growth.

Some of these minor devices doubtless serve the purpose suggested only incidentally, or accidentally, but nevertheless actually, and one must be struck by the fact that so many different methods combine and co-operate toward a common end. One will scarcely find in the entire organism such a large number of diverse mechanisms focussing to one final aim and result. If the end were not of the supremest importance this would hardly be permitted. If interruption of the stimulus were undesirable, the ingenuity of nature would have found a dozen ways to prevent it instead of as many to encourage it.

These numerous devices are, in fact, but a very few of the many proofs of the enormous difficulties met and conquered by nature in the evolution of the eye. These difficulties are, apparently, a hundred times as numerous and as complicated as those of any other

organ of the body. Hence the fineness of the adjustment, the ease with which disease takes the place of health, the limits of normality being almost infinitely delicate and narrow. A glimpse into this amazing mystery is caught by the observation that all this diverse mechanism from cornea to macula must be highly transparent, and yet the greater portion is not controlled by nerve-agencies, and all is nourished by blood which is scarlet. And millions of transparent optic nerve fibers divested of their insulating covering must perform independent and accurate functions!

The most fundamental of the difficulties of the ocular mechanic has undoubtedly been to create a mechanism that shall respond to a stimulus lasting but 0.00144 of a second, and that is hundreds of millions of millions of times more slight than that of sound. This explains why the receiving mechanism or photographic plate of the retina can be kept sensitive for only a few seconds. In order to resensitize it a change or cessation of the stimulus must be insured at least every few seconds. Hence the elaboration of at least twelve methods of insuring the result.

There are many practical lessons to be derived from the physiologic mechanisms mentioned. The almost universal custom of wearing hats, bonnets, caps, etc., finds its *raison d'être* in the need of shading and protecting—not the head so much as the eyes. The chief suggestion that arises is of course the avoidance of

subjecting the eye to a constant stimulus or to a harsh or intense light. It is amazing what the eye will endure when its ametropia is perfectly corrected. It is equally astonishing how easily a little ametropia morbidizes the whole bodily and nervous organism. But it must be noted that not even reading demands absolute uniformity and continuance of the image. There is always a gliding and changing of the shape and size of the image by fluctuations, interruptions, shadings, variations, etc. If our reading was always by means of a consecutive series of letters each appearing for a fraction of a second at one and the same point, there would be very little reading possible. But even with large print, and good paper and ink, one should not demand fixation of the eyes too long at a time. There should be little rests by closing the eyes, looking away, etc., at least every few minutes. In all continuous eye-work of any kind there should be such interruptions. The light should also not be in front, but should illuminate the book, paper, sewing, etc., from behind or above. The book should be held as nearly on the level of the eyes as possible. It is a pity that printing with white ink on a dead black surface is at present an impossibility.

When this important law of retinal fatigue and recuperation is recognized, there will take place a speedy revolution in almost all our practical and esthetic arts, The furniture, wall-papers, carpets, curtains, and win-

dows of our houses will then be very different from what they now are. Let us more closely consider one or two of the many illustrations.

It should dictate the fundamental tones, colors, shape, and extent of our picture-frames. By the old-fashioned gilt barbarisms the artist allowed the framer and gilder almost to monopolize the mental, emotional, and physiologic attention of the spectator and to detract as much as possible from interest in the picture itself. It is only for a few seconds that any human eye can look at a picture when the greater portion of the retina is outraged and exhausted by the adjacent images of the atrocious frame. In the ordinary gallery of pictures these ludicrous and retina-paralyzing frames, close beside each other, become positively torturing. It all seems designed to exhibit, not art, not nature, not esthetic charm and emotional peace, but only the abject hideousness of the plebeian frame-gilder's ~~un~~art. Almost every traveler has noticed the utter exhaustion and headache that is produced by a short visit to a large picture-gallery. The crude harsh gilt is the most wearying of all colors. Recently there has arisen a reaction of which probably no one understands the reason, consisting in the making of frames with solemn and monotonous black. This extreme is infinitely preferable to the other but it is also mechanical and stupid. Each picture should be framed by the painter, or at least, and because he has shown him-

self so blunderful about it, by another artist with this single task in view. Each picture presents a special problem to the artistic framer. It should be done so as to produce a peculiar, logical, and physiologic color-effect, as little wearying to the eye as possible, while dictated primarily by the character, the colors used, the æsthetic aims, etc., of the painter. It should by all means be hung sufficiently apart from all other pictures to allow it the proper necessities of its own individuality and not to destroy that of others hung in the neighborhood. Pictures crowded together give evidence of esthetic sin quite as decidedly as the physical crowding of human beings demonstrates other sorts of immorality. In a word, the present fashion of framing and hanging pictures could not be more un-esthetic and anesthetic, more unphysiologic and pathologic, than it is.

Another corollary of the law of ocular tire and re-sensitization may be noticed in passing—a law that is outraged by the lighting of most of our churches, and of all of our private houses, theaters, public halls, etc. The millions of dollars spent each year in illumination are in great part wasted and misspent, and by the methods used all the harm is done to the eye that is possible. No room should be lit in such a manner that the individual lights are visible. Illumination should be by transmitted, dissipated, and reflected light.¹

¹ See "Artificial Illumination," by Dr. L. A. W. Alleman, *Brooklyn Medical Journal*, December, 1900.

There is nothing more tiring to the eye than numerous separate lights whose images upon various parts of the retina create there a large number of useless and exhausting stimuli and from which there is no escape by and device or turning. American oculists have so many patients who, even with the best spectacles, cannot escape suffering whenever they go to the theater, opera, etc., that the term "theater-headache," or "panorama headache," has come into general use. As much as to the character of the sermon or of the worshiper, the famous sleepiness of the church-goer was due to the somnolence caused by ocular fatigue from harsh lights in front. One of the most common symptoms of eye-strain, known of all oculists, is sleepiness when reading by artificial light. Part of this is certainly due to unphysiologic systems and qualities of the light used.

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• DISCOVERY OF ASTIGMATISM
AND EYE-STRAIN. .

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CHAPTER VIII.

THE DISCOVERY OF ASTIGMATISM AND, EYE-STRAIN.

AMONG the many minds fused in the personality of Thomas Young there were those of the physician and the physicist. Astigmatism was discovered by the mind of the physicist, and great as was the discovery it is a pity that it was so. Many others, and independently of each other, soon rediscovered the fact, so that the world would not long have been without the knowledge of it. While we are proud that we owe the researches and the memoir,¹ "On the Mechanism of the Eye,"² to a physician, the fact that it sprang from the intellect of the nonmedical scientist is of tremendous significance. The optical and mechanical way of looking at astigmatism instituted by Young was carried on by Airy, Donders, Helmholtz, and their successors, and is to-day the certain and sole cause that many millions of people are needlessly enduring lives of intense suffering and wretchedness. To Young and to the youngest ophthalmologist, excepting

¹Read before the Royal Society, November 27, 1801.

²Thomas Young: *Philosophical Transactions*, 1793, p. 169; 1794, p. 21; 1795, p. 1; see also a "Course of Lectures," etc., 1807, Vol. 2, p. 575.

a relatively small number of Americans, the significance of astigmatism has been physiologic instead of pathologic, has related solely to optics and the increase of visual acuity instead of to disease, and the remote effects of morbid physiology. This strange and fatal prepossession at once came out in Airy, who discovered "abnormal astigmatism," that is, "astigmatism that interfered with vision," by which term there was an utter ignoring of the all-important truth that disease is nothing more than morbid physiology. All over the world so-called medical men practising ophthalmology as a specialty have the same conception of the matter, and everywhere the ignorant and greedy optician is criminally allowed to pursue his calling of using articles of the *materia medica* (spectacle lenses) which have as powerful an influence in curing or causing disease as any other, except the violent poisons.

Concerning Young's discovery his worthy successor, Donders,¹ may be quoted:

The distinguished natural philosopher, whose brilliant merits in the domain of physiologic optics were first duly estimated by Helmholtz, was himself nearsighted. In relaxation of the eye, consequently in determination of the farthest point, he saw in his optometer, held in a horizontal position, the double images of the thread intersect one another at seven inches from the eye, on the contrary, at ten inches when in a vertical position. This indicates, on reducing the English to Parisian inches, an astigmatism of $1/25$; and it is, therefore, strange that Young, as he himself remarks, had experienced no dis-

¹ "Refraction of the Eye," 1864, pp. 456-457.

turbance from it. The optician, Cary, to whom Young communicated his discovery, stated to him that he had before often found that nearsighted people distinguished objects much more acutely when the glasses suited to them were held in a particular oblique direction before the eye; now by this maneuver, at least when strong glasses are necessary, a certain degree of astigmatism may be corrected. Young, too, had already studied and delineated the form of the diffusion spots. The source of astigmatism he sought in the crystalline lens, because it continued when he plunged his cornea into water and replaced its action by that of a convex lens. He now assumed an oblique position of the crystalline lens as a cause, and even thought that from the diffusion-images of a point of light it might be deduced that the two surfaces of his lens were not centered. In a double point of view, therefore, Young's eyes presented an exception: the refraction was stronger in the horizontal than in the vertical meridian, and the cause lay principally in the lens.

Nagel¹ states that Gerson, 1810, described astigmatism, in the inaugural dissertation at Göttingen, in the eyes of Professor E. G. Fischer, of Berlin.

We hear nothing more concerning the subject until 1815, when in Vol. XXVIII., "Repertory of Arts," 1816, Stedman Whitewell, an architect, describes square shaped lenses for spectacles in which each side is ground as a cylinder, with the axis of one at right angles with that of the other. No mention is made of the device as regards the correction of astigmatism.

In the "Repertory of Patent Inventions" for December, 1826, there is an article entitled, "On the

¹ *Archiv f. Ophth.*, Berlin, 1866, XII., 25-30, "Historische hotz über Hyperopie und Astigmatism."

means of ascertaining the true state of the eyes, and of enabling persons to supply themselves with spectacles the best adapted to their sight," by John Isaac Hawkins, Chase Cottage, Hamstead Road, and dated September 21, 1826. From this I extract as follows:

I have, through life, noticed that I could not see so distinctly with my right eye as with my left, and recently by the use of the optometer I have ascertained that the indistinctness is occasioned by the vertical focus of that eye being greater than the horizontal focus, while in the left eye they are both at nearly the same distance. By vertical focus is meant the focus of those rays that enter the eye one above the other; and by horizontal, the focus of those rays that enter the eye side by side, the difference no doubt arising from the vertical curvature of the eye being different from the horizontal which may take place either in the cornea or front part of the eye or in the crystalline lens situated within the eye. Having ascertained the average measurements of each focus of my two eyes, I contemplate making glasses for my right eye that shall have greater magnifying power vertically than horizontally; to accomplish which I shall avail myself of a plan patented in France by M. Chamblant, optician, of Paris, and make the surfaces of my glasses segments of cylinders, one side vertical and the other horizontal as described in Dr. Rees' encyclopedia under the article "Spectacles."

In places where an optometer cannot be procured, a book ruled for music will afford the means of ascertaining whether there is any considerable difference between the horizontal and vertical foci of the eyes, and of approximating toward an accurate measurement of them.

To measure the horizontal focus of the left eye, hold the music book with the lines vertical and shut or cover the right eye, move the book nearer to and further from the eye until the ruled lines appear most distinctly; then measure the distance from the book to the eye as before described.

Then hold the music book with the lines horizontal and again move it until the lines appear most distinctly, the distance from the eye will be the vertical focus; open the right eye and shut or cover the left and proceed in the same way to ascertain the two foci of the right eye, always recollecting that to measure the horizontal focus the music lines must be held vertically, and to measure the vertical focus the music lines must be held horizontally.

Hawkins adds that these and other observations in the same article are the results of eighteen years of experience, so that it is probable that he understood astigmatism previous to 1826.

The foregoing reference to Chamblant may be supplemented by the remark of Sulzer,¹ of Paris, who says that lenses formed by two equal cylinders either convex or concave, crossing one another at right angles, were known before 1820. An article by Goode, published in 1847, states that Chamblant had also ground plano-cylinders and unequal crossed cylinders thatiently quote the abstract of Donders²:

The next contribution upon the subject is that of Airy, the Royal Astronomer of England, described in the *Transactions* of the Cambridge Philosophical Society, 1827, Vol. II., p. 267. We may again conveniently quote the abstract of Donders:²

Airy was the first to discover abnormal astigmatism; that is, astigmatism that interfered with vision, in fact, in his own

¹ *Annales d'Oculistique*, 1902, abstracted in *Annals of Ophthalmology*, August, 1902.

² "Refraction of the Eye," 1864, pp. 510 and 483.

left eye. At the same time he conceived that a cylindrical glass might correct the asymmetry, which he actually found to be the case, the disturbance of vision being corrected by such a glass. The form of his astigmatism was the compound myopic. Airy conceived that if he had two concave cylindrical surfaces ground, with axes directed perpendicularly to each other, each corresponding to the degree of myopia to be corrected in the principal meridians, the object should be attained.

As a point of light a small opening in an opaque disk is employed, turned toward the light of the sky, toward a dull glass or the globe of a lamp, and this is moved along a graduated scale, for example, that of an optometer. We then find a greatest distance at which the point of light appears as the most slender line, and a shortest distance at which it again becomes a thin line, perpendicular to the first. The distances then give about the degrees of myopia in the principal meridians.¹

According to Lawrence² the lenses by which Airy corrected his own astigmatism were ground by Fuller at Ipswich (*London Medical Gazette*, Vol. I., p. 134).

The term astigmatism was first used by Rev. Dr. Whewell to designate the defect described by Airy.

In the *American Journal of the Medical Sciences* for April, 1872, N. S., Vol. LXIII., pp. 355-359, there is a note respecting the first recorded case of astigmatism in America for which cylindric lenses were made, con-

¹The theory of refraction by asymmetrical surfaces was developed by Sturm (*Comptes rendus de l'Academie des Sciences de Paris*, t. XX., pp. 554, 761, 1238, and *Poggendorff's Annalen*, B. 65, 116). (Compare with Fich, "Mediz. Physik," p. 327.)

²"Diseases of the Eye," Am. ed. by Hays, 1854, p. 669.

tributed by Dr. Henry D. Noyes, of New York. From this the following extracts are made:

By the kindness of Dr. Gray, of the New York State Lunatic Asylum, Utica, I have come in possession of a pair of cylindrical glasses which I suppose were the first ever made in this country. They belonged to Rev. Mr. Goodrich, who at the time of his death was chaplain of the asylum. They were given to me wrapped in a piece of writing paper on which, in the owner's handwriting, was inscribed the following memorandum: "No. 7 French No. (number) cylinder, con. got of McAllister May, 1828. I wrote fourteen months, *i. e.*, till July, 1829. Again put into use March 11, 1843; they were laid aside December 10, 1850."

The glasses are plano-concave cylinders of seven inches focus with axes horizontal and were mounted in a spectacle frame with oval eyes. The maker is the old and well-known optician, Mr. John McAllister, of Philadelphia.

The following is extracted from the account given by Mr. Goodrich himself:

From my earliest years I have been sensible of a deficiency in sight which I was induced to call nearsightedness because I was obliged to approach nearer to objects to see them than most persons, which is still the case. This deficiency until I was about sixteen years of age was accompanied with weakness of sight, but my eyes are now strong. I commenced my studies regularly at the age of nineteen and am now twenty-four. Close study has had no other effect upon my sight than to strengthen its endurance but not its precision or length. My right eye is and always has been much better than my left, but the defect in both is precisely of the same nature. At the age of sixteen I procured a pair of plain green glasses, which were some little assistance in moderating the intensity of the light. I tried to get concave glasses, but could find none that were of any essential assistance. I afterward used a small

convex lens of about ten inches focal distance, as a microscope, to assist me in reading, which was some assistance, but during the five years of studying I have used no glasses whatever. In November last (1825) I procured a pair of concave glasses in New York, about five or six, which will accompany this letter. Until then I had never discovered that a change of position had any influence on my sight, but in looking through these glasses I found that any object whose length is in a horizontal direction appears much more distinct, than a similar object whose length is perpendicular to the plane of the horizon. Thus the cross-rigging of a ship appears much more distinct than the mast and perpendicular ropes. I have since been led to make experiments first on the naked eye, then on it in connection with my glass, which I send you, and the result at which I have arrived has been universally the same. These facts [experiments and diagram of Goodrich omitted] would lead me to conclude that the crystalline lens of my eye is cylindrically convex or, perhaps, oblately convex, and that its greatest length is in a perpendicular direction (that is, in a line parallel with the length of my body); consequently I would conclude that a glass whose shape resembled the probable shape of the crystalline lens of my eye, placed before my eye so that its greatest length would be at right angles with the lens of my eye, would produce a perfect image. If it be true that my eye requires a glass whose shape does not correspond to a portion of a true sphere, but rather to a portion of a spheroid or, perhaps, a cylindric, I cannot tell from any observations I have yet made on my eyes, whether the glasses should be of the concave or convex form. The great difficulty is why should the appearance of objects be entirely changed by the interposition of a concave glass? When I purchased my glasses I was not aware of this curious fact in regard to my eyes either with or without glasses. I only knew that I got those through which, on the whole, I could see best. If it be asked whether I consider the glasses in question are essential assistance to my sight, I answer that if my object be to examine a horizontal

object, they truly are assistance and they are so in the examination of a perpendicular one, provided I turn my head at a right angle.¹

Leuff² determined the radius of curvature of one cornea in the vertical and horizontal meridian.

Wharton Jones³ and Wilde⁴ assume that the foundation of astigmatism is really to be sought in the cornea and that the cornea in its vertical meridian has a shorter radius of curvature than in the horizontal and they explain Airy's case by a peculiar development of that difference.

Hamilton⁵ reports a case of abnormal astigmatism in 1847.

Dr. Goode⁶ described astigmatism in his own eyes and those of three other gentlemen in the University of Cambridge in 1848.

Stokes⁷ invented the astigmatic lens for determin-

¹ In Lawrence's "Diseases of the Eye," 1854, p. 669, two other cases corrected for him by McAllister in Philadelphia in 1853 are described by Hay.

² Conf. Volkmann, "Art. Sehen," p. 271, in Wagner's "Handwörterbuch der Physiologie," 1846.

³ "Manual of Ophthalmic Medicine and Surgery," second edition, London, 1855, p. 352.

⁴ "Dublin Journal of Medical Science, First series, Vol. XXVIII., p. 105.

⁵ *Monthly Journal of Medical Science*, Edinburgh, 1847, p. 891.

⁶ *Monthly Journal of Medical Science*, Edinburgh, 1848, p. 711, and *Transactions of the Cambridge Philosophical Society*, Vol. VIII., p. 493.

⁷ "Report of the British Association for the Advancement of Science" for 1849, p. 20.

ing the degree of astigmatism in 1849. This consisted of two cylindrical lenses, the one plano-convex of $\frac{1}{16}$, the other plano-concave of $\frac{1}{16}$. These are fastened in copper rings which are fitted into one another and can turn past one another around their axis. The lenses rotate past one another, at the same time their flat surfaces being toward each other. The degree of astigmatism is ascertained by an index and scale on the rings.

Pastor Schnyder, according to Donders,¹ of Meuzburg, discovered astigmatism in his own person.²

In 1855 Helmholtz confirmed previous findings as to the ellipsoidal nature of the cornea, and in 1860 Donders brought the matter to a full and complete scientific statement.

An important factor of progress was now supplied by an American, Dr. Ezra Dyer, who, after extensive studies abroad, returned to Philadelphia in 1861 to practise ophthalmology. He was the first, I think, to perfect the methods of accurate and scientific diagnosis of astigmatism, and its relief by spectacles, as a daily clinical practice. I cannot learn that Dyer had any intellectual conception of the pathologic significance of his work. That honor is reserved for Mitchell and for other Philadelphia specialists in diseases of the

¹ "Refraction of the Eye," 1864, p. 542.

² *Ann. d'Oculistique*, t. XXI., p. 222, Bruxelles, 1849, taken from the "Verhandlungen der Schweizerischen Naturforschenden Gesellschaft."

eye. Dyer's great service was that he first as routine practice did honest and scientific work in refraction. The results soon showed that patients were at once and unexpectedly relieved of their previous headaches and other sufferings.¹ The systemic effects of the neutralization of ametropia by glasses were almost magical, and immediately a number of keen-minded physicians caught the truth and began their successful life-work as refractionists. These were Doctors Thomson, Norris, Harlan, Hay, Morton, Risley, and others.

The house of Queen & Co. began filling prescriptions for cylinders in 1874, the order of the first ones being signed by Norris, Thomson, Thomson, Norris, Norris, Risley, etc., respectively.

Dyer first put into use the test types previously suggested by Snellen, and which in the United States were called "Dyer's Types," or "Dyer's Test Letters."

In 1863 Dr. Hasket Derby, of Boston, reported² four cases of astigmatism, the correcting cylinders being ground by Paetz and Flohr, of Berlin. The first examination for astigmatism and prescription of

¹ Dyer first sent his prescriptions for cylinders abroad to be filled, but in 1862 or 1863 the Philadelphia optician, Zentmayer, was able to fill them. According to Bumstead (*Am. Med. Times*, 1863, VII., pp. 203-205) cylinders were ground by Paetz and Flohr in Berlin, and by Natchet in Paris. In the same article Dyer's test types are described.

² *Am. Med. Times*, 1863, VII., pp. 277-278.

cylindrical lenses in Boston was one of these cases, and was made by Derby on May 12, 1862. The patient was still living on September 30, 1902.

Dr. G. Hay described a case of astigmatism in the *Boston Medical and Surgical Journal*, 1867, LXXV., pp. 513-515.

Dr. John Green,¹ in 1867, wrote a paper on astigmatism as an active cause of myopia.

Dr. O. M. Pray described his test type for the diagnosis of astigmatism in 1869.²

Dr. Mills reported a case of compound myopic astigmatism in the service of Dr. Harlan in Wills Hospital in 1871.³

But up to this time there had been no word or hint that astigmatism had any pathologic significance. With all these investigators it had been solely a matter of physiology, of optics, mechanic or physiologic, referring at best only to visual acuteness. Now, however, arose a man, an American, Dr. S. Weir Mitchell, who must be recognized as one of the greatest medical discoverers and benefactors of the race. So far as I can learn he first taught the pathologic significance of astigmatism and eye-strain, and that the prescription of cylindric lenses is of vast importance in the cure and prevention of systemic diseases.

¹ *Arch. Ophth. and Otol.*, 1869, I., No. 1, pp. 17-21.

² *Am. Jour. Med. Sci.*, January, 1867.

³ *Phila. Med. Times*, 1871, II., p. 70.

Nothing that our distinguished colleague has ever contributed to medical progress can equal the value of that of the masterly articles which he wrote in 1874, 1875 and 1876 upon the subject of eye-strain. "The first was entitled "Headaches from Heat-strokes, from Fevers, after Meningitis, from Overuse of the Brain, from Eye-strain."¹ The second was called "Notes on Headache,"² and the third "Headaches from Eye-strain."³ The last article is a recapitulation and completion of the data and conclusions set forth in the first two, and from it I make the following quotations:

My consultations have plainly enough taught me that hardly any men in the general profession are fully alive to the need of interrogating the eye for answers to some of the hard questions which are put to us by certain head symptoms, since many of the patients treated successfully by the correction of optical defects never so much as suspected that their eyes were imperfect. What I desire, therefore, to make clear to the profession at large is:

1. That there are many headaches which are due indirectly to disorders of the refractive or accommodative apparatus of the eye.

2. That in these instances the brain symptom is often the most prominent and sometimes the sole prominent symptom of the eye troubles, so that, while there may be no pain or sense of fatigue in the eye, the strain with which it is used may be interpreted solely by occipital or frontal headache.

¹ *Medical and Surgical Reporter*, July 25, 1874, and August 1, 1874.

² *Ibid.*, February 6, 1875.

³ *Am. Jour. Med. Sci.*, April, 1876, pp. 363-373.

3. That the long continuance of eye troubles may be the unsuspected source of insomnia, vertigo, nausea, and general failure of health.

4. That in many cases the eye trouble becomes suddenly mischievous owing to some failure of the general health, or to increased sensitiveness of brain from moral or mental causes.

In seeking to prove these propositions I shall use some of the cases which I have already given in the *Reporter*, and others which I have since seen, or which have been put at my disposal by friends who are engaged in the practice of ophthalmic surgery.

I may here remark that the books on diseases of the eye scarcely more than allude to the distressing cerebral symptoms of which I have spoken, except when discussing the subject of accommodative asthenopia from hypermetropia. Yet in practice almost all of the extreme refractive or accommodative eye troubles give rise, in a certain proportion of people, to these symptoms, while in those congenitally sensitive, or who become so in after-life, even slight optical defects, especially when unequally developed in the two eyes, may also give rise to like annoyances.

I have certainly seen cases in which the form of headache caused by eye troubles was a pure migraine or hemicrania, but this I believe to be rare; while I am sure also that in many persons who are already the victims of migraine it has been made worse and more frequent by the over-use of defective eyes, as, indeed, it may be from any cause of exhaustion, and has again been lessened in severity and as to number of attacks by proper correction of the eye disorder. Dr. Liveing, in his interesting and thoughtful work on sick-headache (i. e., megrim) states that M. Piorry long ago described megrim as capable of being caused in those with weak eyes by straining at near or minute objects, and this is doubtless the case; but the form of head-pain, to which I am about to refer, is certainly not, as a rule, of the nature of megrim, and as soon as

it disappears when the eyes are corrected, is lacking, happily, in the obstinacy of that distressing malady:

The following cases fairly illustrate the first two of the propositions I have stated above. First of these I put the following case, because it was the one which earliest opened my eyes on this subject. My tardy knowledge certainly cost my patient a long period of unrelieved distress:

CASE I.—Mr. E., a prominent merchant, consulted me for pain in the upper spine and occiput. It increased day by day every winter, and left him during the summer, which was spent in shooting and fishing—a tent life, in fact. Mr. B. was even cauterized in New York for these pains, and here at home he had much able advice beside my own. When I first saw him I was thoroughly misled. It was late in the winter, and, as usual, while in the autumn only writing at first, and then later reading, and then any near work, caused pain; as time went by there came a period when all mental labor, when excitement, motion, or any thought caused pain. He was in this over-sensitive state when I saw him, and was aided by nothing I did. His holiday cured his head, and on his return some friends, I believe, suggested to him that his eyes might be weak, and with this idea he consulted Dr. William Thomson, who gave me the following additional particulars from his notebook:

“Writing had become so distressing to this gentleman, that for a year past all letters have been written by a secretary, at his dictation. He states that a few moments spent in writing give him a creeping sensation up the spine and through the back part of the head, followed by giddiness and severe pain, so urgent as to render him fearful of a ‘fit of some kind.’ . . . His compound hyperopic astigmatism was corrected, and on using the glasses habitually, his distressing symptoms quickly disappeared. He has long since forgotten his apprehensions of an impending apoplexy or epilepsy; he can see as sharply as any of his companions, and he can use his eyes continuously in reading, writing, or any near work.”

Relief in this case followed at once the use of glasses, which proved competent without other means to conduct him to perfect and useful health again.

The following case will answer to show how profoundly the whole system may be perturbed by an ocular defect :

CASE II.—Miss J., an accomplished and energetic single lady, aged 30, from New Jersey, having the care of a sick mother and of a household, began some five years ago to have evening headaches, pain in the back of the head and neck, sense of extreme fatigue and violent flushing if she persisted in exerting her mind in writing or reading. Unfortunately, a portion of her income and much of her pleasure in life depended upon her ability to write, so that for a long time she continued to do so, despite the increase of all her troubles. When at last she came to me, a feeble, nervous, anemic woman, sleeping little and cursed with headache almost constantly, I confess that for nearly two years while I saw her at intervals, I looked everywhere but to her eyes for the cause of the mischief. At length, after a most unsatisfactory winter of rest from work, freedom from care and many tonics, I made a more careful study of her eyes, and having grown sure that they were imperfect, asked her to consult an ophthalmic surgeon. At this time the use of the eyes brought about pain in them and sense of fatigue, whereas at first the headaches, which came only after long use of the eyes were, as I have said, unaccompanied by any sense of trouble in the eyes. Her compound hyperopic astigmatism was corrected (by Dr. Thomson) and she was seen again May 26. Headache has disappeared, sleeplessness has vanished; she can read and write without pain, and she uses her glasses constantly. In October this lady was seen again, and pronounced herself long since relieved and able to use her eyes constantly, with the correction, in all near work.

I myself saw this lady anew this autumn. The change in her appearance was remarkable, and was, I think, solely due to relief of the strain with which she used her eyes. The headache left early, and with it the sleeplessness. Once able to slumber and to get rest, the body swiftly repaired damages, and the anemia also departing, a general gain in flesh, color and strength were the results.

Another patient (corrected by Dr. Thomson) reports herself as perfectly comfortable, and only distressed at the loss of 16 years of useful life, and now able to read or sew as much as she wishes.

The cases just told seem to me enough to prove that the eyes may long rest unsuspected as the cause of headache, and of other intracranial distresses and disorders. Case II. is the more remarkable of those which illustrate this fact, because when attending this lady I was already on my guard as to this cause of headache, and yet was for a long time altogether misled. Who, indeed, could have supposed that a mere ocular defect could have given rise to so serious a train of evils—beginning with headache and ending with unconquerable anemia—and who that had not seen it could believe that the correction by glasses of the eye trouble could have given a relief so speedy and so perfect that she herself described it as a miracle.

CASE V. was that of a woman of 27, who had nervous and spinal troubles, frequent headaches, and prolonged hysterical states. Dr. Wm. F. Norris, to whom she was sent, corrected her astigmatism, compound myopic in one eye, and compound hypermetropic in the other, and the relief given in the case was almost immediate, but some time elapsed before the headaches were entirely lost.

Dr. Wm. F. Norris sends me the following very striking case of hypermetropic astigmatism in which there was no eye pain, but violent headache, described as neuralgic, with nausea and vomiting. The relief given by glasses was absolute and abrupt.

The third proposition, to the effect that vertigo of most alarming character, as well as other intracranial symptoms, may be the chief expression of eye lesions, is illustrated by the following cases:

CASE VIII.—Miss B., aged 16, was well until her periods began, and these being copious, she found that for several days afterward she had headaches which came only upon use of the eyes and were less grave as the month of interval passed by. I suspected the cause, and, in fact, learned that she had unequally myopic eyes. I advised that these should be corrected, but as her family physician insisted that she must have had the eye lesion always, and could, therefore, not be suffering suddenly from what had always been present—she was easily persuaded to yield to her own dislike of glasses, and so nothing was done save only to strive to lessen the menstrual flow.

After a year more she came back to me with an addition to her symptoms of occasional unsteadiness of gait, with a sudden sense of terror and vertigo. The headaches were no better. In a half-conscious self-defence she had given up sewing and writing and read little, yet still the headaches continued because she had now reached that advanced stage of sensitiveness in which the ordinary every-day use of the eyes was hurtful. Of late, too, her rest was broken and disturbed by dreams. Meanwhile, also, she had been reexamined, and by the aid of the ophthalmoscope discovered to have cerebral anemia, because, as I was told, the headaches went away in the night, when, owing to her prone position, more blood went to the head.

The ophthalmoscope is just now where the stethoscope was forty years ago, and is called upon to do things which I do not think it can do, so that I am grown a little suspicious of statements as to diagnosing by the eye-ground vessels the amount of blood in the head. Save only in the case of gross lesions the value of the ophthalmoscope has been overrated. I, at least, am unable to diagnose slight degrees of cerebral anemia from the state of the vessels of the disk.

My patient had been endlessly treated with tonics, but somehow none did any good, and she was surely hastening toward a course of uterine treatment, the usual goal in difficult cases of obscure disease in women. At this time I urged her to travel in Europe, and while there to have her eyes corrected. She took the agreeable part of my advice, but gaining little from a few months of too rapid and wearying travel, again wrote to complain of increasing headaches and of more frequent spells of ocular vertigo. I could only urge anew the correction of the eyes, especially since she had improved in color and as to gain of flesh, with no like bettering of the cephalic troubles. This time she took my advice and was persuaded to wear her glasses steadily. At first the vertigo grew worse, but soon it and the headaches and the insomnia passed away, so that in a month she was able to sew, write, or read for hours at a time.

This briefly-told case is somewhat instructive, but I have given it chiefly because of the vertigo, which is seen in some instances, but which few physicians would suspect to be due to troubles in the eye; nevertheless, I have learned to look to it as one source of the symptom vertigo. There is an ocular vertigo as well as an aural vertigo, and I believe that I have seen it under three sets of conditions. Thus it is sometimes caused by a sudden lessening of intraocular pressure, but is more often seen in cases of disorder of the accommodative, or of the extraocular muscles; being after all neither so common nor so easily caused as the analogue, aural vertigo. Usually, indeed, it comes only after the eye trouble and some other cause of general weakness have made the intracranial circulation unstable. Occasionally, as I believe the oculists know, a dose of atropia used in one eye will bring it suddenly; and this is more notably seen in persons whose balancing power is already affected by posterior spinal sclerosis or by cerebellar growths. Perhaps the most important, because the most misleading point in all of this subject, is the fact that such as are in sturdy health are often able for years to overcome, without

sense of strain, muscular difficulties in binocular accommodation, and to endure unharmed astigmatism with accommodative troubles. But with increase of years their powers fail, and they begin to feel the added exertion now needed in some shape—either in eye or head, or in both. Or else it chances that to one of these people comes an attack of illness, a moral or emotional strain, or a time of overwork with worry, when at once the eye trouble leaps into mischievous prominence, and once felt is felt through all the future more and more by a brain which, in the language of the photographer, I might aptly describe as having become oversensitized. I have seen in my practice or in that of others examples of this sequence.

I must now, I think, have amply illustrated the fact that eye-strain causes headache and worse disorders, and is often their unsuspected cause. Simple deficiency of power in one internal rectus muscle, if extreme, results in the patient being so utterly unable to overcome it as to give up the effort and allow the eye to roll out, contenting himself with clear monocular vision. The effort needed to overcome lesser weakness is a competent one, but ends in incessant exertion and fatigue. The accommodative effort needed in hypermetropia, especially with astigmatic trouble, is extreme, owing to the instinctive and never-satisfied craving for distinct vision, and hence the source of fatigue. I presume that the strain made on the eye by these various forms of trouble in sight is due largely to the fatigue which ever comes of the need to make volitional efforts to effect movements which, in ordinary use, are sensually guided, and are more or less in this view automatic. Besides which the use of the eyes is so incessant that it is impossible for the victims by any means save glasses to put the eyes at rest; so that often the strain is nearly incessant.

The profound and far-reaching importance of these conclusions of Dr. Mitchell will not be adequately recognized for generations. Since he established them

many an American oculist has personally seen thousands of such cases in which, as if by miracle, lives have been changed from abject misery to happiness. As he looks over the world, and especially the European world, he knows that there are millions suffering in the same way who could be immediately cured were it not for the false conception of astigmatism and other forms of ametropia entertained by medical men and ophthalmologists. For the genius that first recognized the truth and for the fearlessness that published it no honor is too great.

Several weighty improvements, however, were still needed to give the discovery that accuracy and practical usefulness which should make it play in the world its role of splendid beneficence. These were:

1. The extension of the method of estimating and correcting astigmatism to the hyperopic, compound hyperopic, mixed, irregular, and unsymmetric varieties. This was done largely by the Philadelphia specialists contemporary with Mitchell. The astigmatism observed before Dyer was myopic, a very small portion of that existing, and relatively speaking producing few reflexes.

2. The practical correction of anisometropia. All text-books up to 1892 taught, in the language of the German master, Fuchs, that

"In anisometropia we give the same glasses for both eyes, or correct only one eye and place a plain glass before the other."

This pernicious error was controverted, so far as I am aware, for the first time in 1892.¹ It was contended that it is unmedical, unprofessional, and unnecessary to leave an amblyopic eye, injured from disuse, to its fate.

3. The bifocal spectacles. An American genius, Benjamin Franklin, invented bifocal lenses for use in presbyopia, and an important improvement, the "cement bifocal," was adopted in 1888 by Philadelphia physicians. These devices have been of vast service in lessening and extinguishing the evil effects of eye-strain in presbyopes.

4. The perfecting and making practical of the art of retinoscopy. This was also the work of Philadelphia specialists. Only by this method can there be accuracy of diagnosis of ametropia in children and in the amblyopic.

5. The recognition of the pernicious influence of eye-strain upon the digestive and assimilative system, in the production of functional gastric and intestinal diseases, of chorea, of hysteria, of epilepsy, etc. This has been brought about by the advocacy of other specialists of Philadelphia or by their pupils located elsewhere.

6. The repression of unprofessional methods, *e. g.*, the operative manias of the tenotomists; the attempted

¹"Amblyopiatrics," by George M. Gould, M.D., *Medical News*, December 31, 1892.

diagnosis of ametropia by machinery, the ophthalmoscope, ophthalmometer, etc.; the uselessness and inaccuracy of diagnoses made without cycloplegia; the medical barbarism of the refracting opticians,¹ etc. These things bring discredit upon the true science of ophthalmology.

7. The evil psychologic influence of eye-strain. This was first pointed out by a Philadelphia oculist in 1888. Children suffering from ametropia have their intellects and dispositions warped, injured, or wrecked. The subtle malign influence of eye-strain upon character is of enormous importance.

8. The economic and social significance, both public and personal, of the correction of eye-strain. A life may be handicapped in its usefulness or even wasted without such correction. Eye-strain is one of the great causes of weakening of vital resistance, so that other diseases secure easier foothold. It causes inflammatory and operative diseases of the eye. It creates many of the defective and criminal classes. It is so large an unrecognized expense item in our educational and school system that it would pay the State,

¹ These are becoming more and more scarce in Philadelphia, and consequently there is a growing class of honorable firms who take pride in their true function and from whom patients can get such serviceable and scientific work as the "eyes-examined-free" men never dreamed of doing. The optician must no more sell glasses than the druggist poisons without a physician's prescription.

cities, and institutions of learning to have an official oculist whom every pupil and student having no private oculist should consult.

There is thus a genuine significance in the term *The Philadelphia School of Ophthalmology*. It is that today a hundred or more conscientious and skilled oculists in this city are, before and above all, physicians, convinced of the clinical value of refraction when estimated by subjective tests under cycloplegia, in curing numerous types of headache, neuralgia, vertigo, functional diseases of digestion, assimilation, and of the nervous system. They also know that such diagnoses and such cures cannot be made by the methods in vogue in Europe, and that the great clinical value of refraction consists precisely in preventing those inflammatory and operative diseases of the eyes which make up the daily practice of the vast majority of the oculists of the world. Learning their art directly or indirectly from the so-called Philadelphia school, hundreds of oculists are finding a noble lifework throughout the United States, and are giving a million patients the indubitable proof of personal experience that eye-strain is the cause of terrible and varied diseases, the cure of which, by spectacles, is one of the greatest medical discoveries of the nineteenth century.

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• RESPONSIBILITIES. •

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CHAPTER IX.

RESPONSIBILITIES.

ALL agree that the great men, and especially the literary and scientific geniuses of a nation, are its most valuable assets. They belong, indeed, to the world rather than to a part of it, and to civilization itself. No valuation can be put upon their lives and work, so far are they beyond all ratings. So far as money goes, the aim of three of the men whose clinical biographies we have considered was a mere living, providence for the simplest wants, in order to give for all and for all time the priceless products of their minds. The other two men asked for no material reward for their life-work. All, however, beyond any other thing, wanted health and freedom from suffering, but the life of each was one of constant endurance of pain and misery. None can know how this fact crippled their productivity, and how profoundly it changed the character of their works. To themselves the cause of their afflictions was the most absolute and tormenting mystery. When we bring to a focus the few hints, echoes, and traces of symptoms we may gather concerning the cause and nature of their diseases, we discover a most remarkable likeness of symptoms, of conditions start-

ing them, and of the method of relief to which all were driven. By whatever name they described their complaint, headache, vertigo, biliousness, dyspepsia, apathy, misery, it was closely and inevitably consequent upon use of the eyes in reading and writing, and was relieved by stopping such use. These men, pursuing a literary occupation, used their eyes in this way whenever they were not actively exercising, and so they naturally held that their relief came from such exercise in the open air. It is strange to us how each one of them never once clearly saw the significance of the fact, the connection between ocular function and suffering, while every day it was plainly before their attention, and even many times expressed in words. Miss Barrett almost caught sight of the law several times, and if she had been a physician she might have uttered it so sharply that it would have been recognized by the medical profession. And the medical men to whom they turned in their agonies had no suggestion to offer as to this terrible mystery. The empty words "biliousness," "overwork," "indigestion," "heredity," etc., were all they could utter, and as for therapeutics the simplest said "mercury," and the wisest said "walk"! Each of the patients was finally reduced to treating himself; one settled on opium,¹

¹ From the Browning correspondence I excerpt:

"Did you walk past this house on the other side of the street Sunday about 2 o'clock? I am so near-sighted that I

another, after drug-failures, on castor-oil, a third on wet-packs, and the fourth and fifth solely on walking, which indeed for all was the final and only effective could only see a shadow in the dimness—but the shadow had—or seemed to have—a sign of you—a trace of you.” (E. B. to R. B., April 14, 1846.)

“My opium comes in to keep the pulse from fluttering and fainting—to give the right composure and point of balance to the nervous system. I don’t take it for my spirits in the usual sense; you must not think such a thing.” (E. B. to R. B., Vol. I, p. 277.)

“Do you care so much about the opium? Then I must care—and get to do with less at least. . . . It might strike you so strange that I, who have no pain, no acute suffering—should need opium in any shape. But I have had restlessness till it made me almost mad—at one time I lost the power of sleeping quite—and even in the day the continual aching sense of weakness has been intolerable. So the medical man gave me opium.” (*Ibid.*, p. 451.)

“You wonder how I can spend quarterly the forty pounds that come to me? I *do* spend them. . . . My greatest personal expense lately has been the morphine.” (*Ibid.*, p. 399.)

All through the correspondence and in the life of Mrs. Browning there are vague allusions to headache and ill-health. At the age of fourteen when saddling her pony she had fallen backward, and hurt her spine. This caused her a great deal of suffering, “the nature of which remained for some time undiscovered.” How much or little this was the cause of her life of ill-health must remain a mystery. And the same may be said as regards her certainly existing ametropia. Between one and two dollars’ worth of morphin a day was, even in 1846, a large amount. Mrs. Browning died years after this. I append the quotations as evidence of another phase of the question, and as one more illustration of: “and so the medical man gave me opium.”

cure—though at best but partially and temporarily so. Cure, of course, it was not in a strict sense, because all genuine cure depends upon a knowledge of the cause of the disease. The physicians of these men did not suspect, and thousands of the physicians of other patients have not suspected the cause, because of their faulty observation. Up to a certain time, say for the last thirty years, this inaccuracy of observation was perhaps not blameworthy, though one wonders that the thousands whose official duty was diagnosis should have been less curious and quick-sighted than Miss Barrett. The nearest any came to a glimpse of the evident fact was Sir Andrew Clark, with whom it was routine to order his literary patients to quit work and to travel. He evidently recognized the good result empirically but had no insight of the reason of the consequent improvement in health. It seems to us now that it is a very easy step in logic and the analysis of symptoms to see that when reading, writing, or proof-reading was always followed by intense suffering they probably stood in some causal relation to the suffering.¹ Two of our patients knew what the optical powers of lenses meant, and all of their physicians should also have understood microscopes; they also knew that the eyeball is an optical instrument. They

¹ Even in the time of De Quincey Dr. Begbie noticed that literary men and students had headache, and that it was to them "a common source of annoyance oftentimes of misery."

would have flung a microscope into the corner, in disgust had it been in a small degree as optically faulty as their own eyes, which they used as a part of the system of lenses in microscopic investigations. And one of these microscopists was also a physiologist.

If it is to be admitted that criticism is out of place, as to physicians of half a century ago, the rule cannot obtain as to the physicians of the last twenty-five or thirty years. In that time astigmatism and the method of its cure have been the common knowledge of the alert-minded. In all of that time the evidence of the influence of errors of refraction in producing headaches has been before the scientific world. But few medical men have made that knowledge an integral part of their practice, and the vast body of the profession has ignored it. Moreover, for ten or more years proof has been obtainable and offered that this same eye-strain may and frequently does cause functional digestional disorders.¹ And yet to-day learned books are being issued by learned physicians, on headache, neurasthenia, and stomach diseases, which either contain no mention of eye-strain as an etiologic factor,

¹ My first cases of such reflex ocular neuroses as flatulent and other dyspepsias, cardiac palpitation, chorea, etc., were reported with statement of the general law in the *Medical and Surgical Reporter*, January 9 and March 9, 1889, and in the *American Journal of Medical Sciences*, January, 1890, and in the *Journal of the American Medical Association*, September 19, 1891.

or such mere mention as to make the truth more stupidly and more superciliously ignored. Why is this? There are several reasons for this strange and morbid persistence of error:

1. The biologic or evolutionary history of organs and of disease is neglected, and often this only can explain present functions and malfunctions. In the day when food is far better, more constant, and when the art of its preparation is most perfected, when life is more orderly and temperate, dyspepsia is said to be far more prevalent than ever before. The influence of civilization upon the eye is also not recognized as being so highly different from that in previous ages of man or animal. The value of vision to the organism is so great that any other organ and even all others must be made to endure the injury rather than that of vision. Hence the whole system must often become the vicarious sufferer for the sins of the eye. To this is also added the powerful action of sexual selection. The eye is so absolutely essential to beauty that in women especially, inflammation, the natural result of malfunction, must not be allowed to harm its appearance. Headache, nutritional and other inhibitions, and multi-form reflex neuroses, are the inevitable results. It is impossible for nature, who never made anything perfect or symmetric, to make the eye an optically perfect instrument, either organic or functional. Helmholtz said of the eye that if his optician were to send

him such an instrument he would return it for alterations. The least optical imperfection may endanger the organism and prevent success, and the efforts of compensation, especially in civilization, become as painful as are all excessive and continuous efforts, and even more so, because of the delicacy of the mechanism and the infinitesimal nature of the stimulus.

2. Modern medical science has been expending all its strength and intellect on the discovery of the causes of infectious disease and on the treatment of organic disease. In essence the plan was good but the neglect of other things was not good. There is a tragedy in the neglect of non-infectious and functional diseases, which do not cause so many deaths, but which do cause vastly more direct suffering than the organic and germ diseases combined. And the scientific medical man is also forgetful of the fact that functional disease is the cause of much organic disease. Evolution itself is the formation and modification of habits. At least 80 percent or 90 percent of headaches and a very large proportion of digestional or nutritional diseases are dependent upon eye-strain, and these headaches and digestional disorders together are direct or secondary sources of a large part of the functional diseases and misery of the world.

3. Science and even medical science is slow to recognize the unity of the organism and the close interrelation of its parts. "The passing of the reflex" has

even filled medical journals with jubilations. But the reflex remains. All physiology, in method of mechanism, is little else than a system of reflexes, and there is no escape from the much ignored truth that pathology is morbid or abnormal physiology. Hence the origin of the disease is very frequently morbid reflexes.

4. The general physician has not failed to add to the neglect of "the ophthalmic gospel" by consciously and unconsciously ignoring what should have been his noblest opportunity. "Curing" headache and dyspepsia by drugs and without curiosity as to cause, "curing" these in the same patient at frequently recurring intervals for years—this is neither medicine nor morals. It is an unpleasant subject, a hateful truth, but one must speak if frankness is advisable and error wrong. Every week books, editorials, and articles still appear upon neurasthenia, vertigo, headache, stomach-diseases, etc., in which not a word is said as to the greatest single cause of these disorders.

5. The lay world, so far as it has any opinion on the question, thinks that spectacles are only to enable one to read and write when old age has begun to appear. No one likes to admit the oncoming of old age, even to himself, and so profound is the influence of pride and sentiment that they have been potent causes in preventing the needed adoption of one of the greatest reforms and blessings in the world. "It is so sad to see bespectacled children and young people!" But if

they are needed it is infinitely more sad to see them without spectacles.

6. There is an almost universal belief on the part of the laity that glasses are not needed because the (distant or about-the-room) vision is good or supposed to be perfect. "If the eyes do not hurt, and the vision is good, then," the popular logic is, "of course glasses cannot be needed." The truth is that the morbid distant reflexes to the head, stomach, etc., take place only when the vision is good and the eyes do not suffer. It is when the neutralization of the ametropia is possible and is attained with intense though perhaps unconscious exertion, when the eye does not suffer or lose clearness of vision—it is precisely then and then alone that appear the reflexes of dyspepsia, biliousness, headache, etc.

7. The want of the requisite accuracy and scientific attention to detail on the part of the oculists makes it difficult in the greater part of the civilized world to obtain a diagnosis of errors of refraction which shall be so precise as to give relief of the suffering that flows from them. Few even of scientific men realize the infinitesimal conditions and forces they are dealing with. The eye responds to a stimulus many millions of millions times more slight than the ear; the entire defects of the eye upon which eye-strain depends, concern only $1/200$ or $1/300$ of an inch in the measurements of diameters and curves; the evolution of the

eye is such that civilization puts it to a new function in recent years for which it was not created or habited. The success of the animal or savage depended on sharp distant vision; that of the city-dweller usually on sharp near vision, which requires a different ocular mechanism.

8. Oculists have also trusted too much in instruments and the objective methods of diagnosing ametropia. The subjective method, with mydriasis, when, as is usual, it is possible, is the sole reliable method. It is physiologic optics with which we have to deal, not mechanic; the living ever-varying eye, not the refraction, *e. g.*, of a piece of glass. There is in all medicine no work requiring such untiring patience, almost infinite expertness, and broad-minded perfection of judgment, as the solution of the problems of refraction.

9. Ophthalmologists have been derelict in their duty in giving way to popular prejudice, in seeking surgical success, while indifferent to the higher and nobler function of preventing disease by means of the relief of eye-strain. Men nine-tenths of whose office work and income is from refraction will make up their society programs with papers nine-tenths of which concern operations, tumors, and inflammatory diseases.

10. Scientific ophthalmology has been hurt by the absurd faddism of the muscle-cutters. The failure of their wild enthusiasm and exaggerated claims has naturally disgusted the professional and lay world with

the whole specialty, and in this way has withdrawn attention from refraction, the real source of manifold reflexes and of muscle-imbalance themselves.

II. In his proper art and work the optician has usually been so backward, and in his impertinence and assumption so forward, that both have conspired to engender disappointment and disgust. Few opticians can rightly do their legitimate work, the making and fitting of spectacles. And this is because they are striving to do the physician's duty. It should be as illegal and impossible for an optician to sell a pair of lenses without a physician's prescription as it is for a druggist to sell poison without medical warrant. The latter kills instantly, the other slowly.

I have chosen to study only five men whose occupation demanded much "near work" with their eyes. Those selected have been such as the accidents of borderland reading called to my attention. In the lives of a number of others I found no suggestion of the pernicious influence of eye-strain upon life and labor. In the biographies and letters of others there are the most striking suggestions of this truth, but however convincing to me, they would not at present be so to others. The Berlin oculist Liebreich was certain that the peculiar character of Turner's pictures was due to his astigmatism, and that if they are viewed through proper astigmatic lenses, these paintings would appear as those of other painters with normal eyes. The

musician Tschaikowsky was troubled all his life by sleeplessness, fatigue and depression, and in his thirty-seventh year he had a complete nervous collapse. The necessity of gleaning the few significant clinical facts of a man's life from the modern slipshod, unworkmanlike, unindexed biography, with its inattention to those matters of the most profound importance, makes it difficult in the few, but, impossible in the many, to get the data for making up a true picture of the real physical and physiologic man. Doubtless many other literary and scientific workers have been and still are sufferers from the same cause as the five cited. Surely the foolish excuse offered that their great mental labor caused their ill-health is the veriest nonsense. Their mental strain was no greater for them than it is for thousands of their colleagues, and for millions of workers in other fields of intellectual labor. The particular lesson of their lives is of value as we learn and apply it to others who are to-day enduring the same agonies, unconscious, as were they, of the true nature of their malady. The saying, that "genius breeds upon dyspeptic soil," is as stupidly untrue as any ever devised by ignorance and conceit. And not only for the great and famous, the sound of whose complaining may come to our ears, but for the millions of the slaves of civilization who complain only to their nearest friends and to their family physician. Eye-strain is crippling the mental, moral, and physical

health of a certain proportion of all school children and students. I believe this proportion is larger, but let us say that it is only one in ten; that in the civilized world would include at least 10,000,000 to 15,000,000. Then there are the clerks, the hand workers in manufacturing industries, the seamstresses, etc.—the large majority of the inhabitants of civilized countries—whose eyes are put to the same strain, and a certain portion of whom we know have astigmatic and other ocular defects causing eye-strain.

There are several ways of answering the indifferentist and the unconvinced. The question is capable of easy and certain decision, so soon as the present indolent skepticism shall give way to intelligent interest.

1. Examine the evidence! There are hundreds of honorable conservative physicians who have put their experiences on record or who would willingly testify that eye-strain is often the cause of the disorders such as those of our five patients. It would be easy to gather from medical literature an astonishing mass of reports of cures of these affections by the relief of eye-strain. The suggestion would call up in the minds of most American oculists memories of a large number of patients who have been cured in this way of precisely the same symptoms as those of the five examples chosen. I know one who would bring the proofs of several thousands of such cures.

2. Make the actual test. Every person has several

acquaintances who are great sufferers from headache, "biliousness," vertigo, dyspepsia, etc., not due to organic disease. Let such a person be taken to an expert refractionist, and if spectacles are needed, let them be prescribed after cycloplegia and subjective testing. If one case does not convince, there is no difficulty in finding subjects for a hundred repetitions.

3. Try the test for differential diagnosis—the instillation, the patient being under professional care, in the eyes, once daily, of a solution of atropin (four grains to the ounce), for ten days. If the symptoms are due to eye-strain, and if not so chronic as to have induced organic changes, the paralysis of the muscle of accommodation will give almost immediate relief.

4. Reverse a few tests. There are many thousands of American patients who have learned that the spectacles they have been wearing cured them of these symptoms and who find that when the refraction changes, as it often does, when lenses are broken or badly fitted, there is at once a return of the old symptoms. Secure the cooperation of such patients in human vivisection experimentation, and get them to stop wearing their glasses for a week or two.

5. Produce the symptoms in a new case. Take a well and uncomplaining person and get him (or her) to wear a pair of astigmatic and anisometropic spectacle lenses, the same as are prescribed by oculists for the cure of these reflex symptoms. Such spectacles will

produce artificially the same ametropia as exists naturally in other patients, and they will also produce the symptoms complained of by Darwin and the rest.

This theory is at least a working hypothesis, and as there is admittedly no other scientific etiology of these affections worth consideration, and no cure that cures, it behooves the entire profession to test the hypothesis most seriously and vigorously. Mere indifference, neglect, or contempt, will not longer answer the demands either of an earnest philanthropy, or of a dignified science.

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